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CHRONOLOGICAL OUTLINE SUMMARY  
OF DEVELOPMENTS IN WHITE PINE BLISTER  
RUST CONTROL IN THE UNITED STATES  
1906 - 1952



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CHRONOLOGICAL OUTLINE SUMMARY OF  
DEVELOPMENTS IN WHITE PINE BLISTER RUST CONTROL  
IN THE UNITED STATES

1903 - 1952

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Compiled by  
C. C. Perry, Control Specialist  
United States Department of Agriculture  
Agricultural Research Administration  
Bureau of Entomology and Plant Quarantine  
Northeastern Region - Greenfield, Massachusetts

June 30, 1953



## FOREWORD

This statement summarizes in outline form, the annual developments in the control of the white pine blister rust in the United States, from the time of the discovery of the disease in this country in 1906 through the calendar year 1952. The material is presented in six categories, namely, Discovery and Spread of the Disease, Laws and Regulations, Procedural Developments, Accomplishments (Statistical) and Bibliography. In general, the developments in each region are presented separately in each category.

The report has been designed as a permanent record of the activities of federal, state, and local agencies, and pine owners under the leadership and direction of the U. S. Department of Agriculture.





GENERAL OUTLINE BY CATEGORIES

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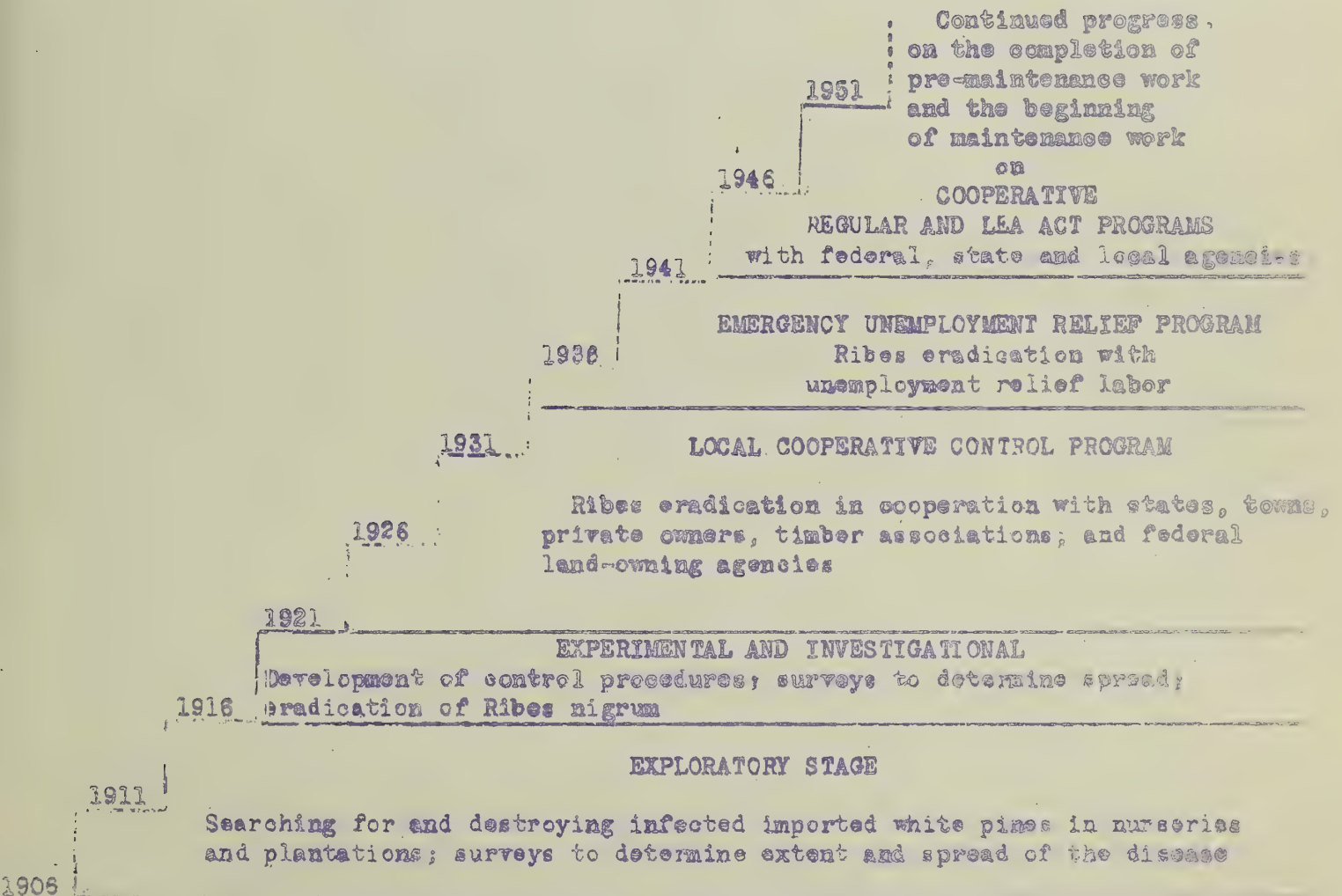




MAP SHOWING RANGE OF WHITE PINE  
IN THE UNITED STATES



STEPS OF PROGRESS  
IN WHITE PINE BLISTER RUST CONTROL  
IN THE UNITED STATES  
1906 - 1952







## DISCOVERY AND SPREAD OF THE DISEASE





DISCOVERY AND SPREAD OF THE DISEASE  
NORTHEASTERN REGION

1906

Infestation found in cultivated pine at various places, but later attributed to natural plot destroyed.

1908

Infestation discovered on imported white pine at Lake Clear, New York; Wilton, Connecticut; Andover, Massachusetts; and Levistown Jet., Pennsylvania.

Note: Herbarium specimen of infected pine collected by Wm. H. Sargent in a nursery near Philadelphia, Pennsylvania in 1897. Studies at Kittery Point, Maine indicate introduction of the disease on European black currants (Rubus nigrum, L.) in 1897.

1914-1915

Infestation found in imported pine from Europe and from nurseries in nurseries and in plantations in New England, New York, Pennsylvania and Ontario. The first importation of infected pine found in the United States in 1912. promulgation of quarantine in 1912.

First infestation found on native white pine in Massachusetts and New Jersey in 1915.

1916

Conditions favorable for the spread of the disease. Found on native white pine in eight New England States; in Vermont, in Berkshire and Essex Counties in Massachusetts; Essex County, Maine; and Warren and Essex Counties, New York. Disease generally distributed on pine in New England and New York.

1919

A peak year for the spread of the rust to pine.

1920

The disease generally distributed on pine and ribes hosts throughout New England and New York.

1921

Rust discovered on native pine in Pennsylvania.

1925-1927

Very wet years favorable to spread of infection. In 1927, Wm. H. Sargent found all of adult white pine in Pennsylvania infested the young of the disease on ribes in 37 counties.

1934

First infected native pine found in New Jersey.

SOUTHERN APPALACHIAN REGION

1911

Infection found on imported white pine in Clarke County, Virginia.

1931

Infection discovered on ribes and pine in Maryland; on ribes in Virginia and West Virginia.

1933

Canker of 1922 origin located on native pine in Virginia.

1937

Infection found on Ribes nigrum in Delaware.

1941

Infection located on ribes in North Carolina and Tennessee. Greatest single year spread in the region.

1945

Infection found on pine in Grayson County, Virginia and Ashe County, North Carolina, a new southernmost limit of infection on pine in the region.

1947

Infection discovered on pine in Tennessee. Five new centers of pine infection located, the largest being a 30-acre tract in Bland County, Virginia.

1948

Infection found on pine in Mercer County, West Virginia. In Tennessee, the first infection on ribes was located in the Cumberland Mountain Range in Morgan County.

1949

At the end of 1949, the rust had been found in 83 of the 117 white pine counties in the region and in all the white pine states except Kentucky and South Carolina. Infection on ribes discovered in Union County, Georgia. Blister Rust continued its march South, being found for the first time on white pine in Buncombe, Haywood and Yancey Counties, North Carolina.

1950

No long distance spread from pine to ribes noted. Infection reported for the first time on white pine in Amherst County, Virginia.

NORTH CENTRAL REGION

1910

Defoliation found on white pine imported from Sweden and Germany to Maryland in Lake and Summit Counties, Ohio and Gibson County, Indiana.

1915

Defoliation found on imported pine in both Canada, Wisconsin, Iowa and from Minnesota from coming by an Illinois nursery within 100 miles of the neighboring states.

1916

Defoliation found on imported pine in Chicago, Kentucky, Lake and Washington Counties in Minnesota. Spread of the disease to native pines and firs noted.

1917

Defoliation discovered on imported pine in Oakland County, Michigan and on Pinus flexilis in Iowa.

1919

Disease reported to be spreading in several states from original infected material to native pines, especially in Wisconsin and Minnesota.

1927

Disease generally distributed on Pinus strobus in lower Michigan. On all pines in Minnesota, 9.3 percent of the pines found infected.

1928

First infection located on Pinus strobus in Michigan (Polk County).

1929

Rust found on Ribes nigrum in Iowa.

1931

Rust reported on ribes in Ohio and on pine in Iowa.

1932

By the end of 1931 the disease was prevalent throughout the Lake States.

1934

Many new rust infection centers found in the Lake States; new pine and ribes infection also located in Ohio and Iowa.



1935

Infection discovered on ribes in Indiana and Illinois.

1937

Infection on pine had been found in all important white pine growing counties of the Lake States with damage stage reached in some northern sections.

1938

Rust detected on ribes in 56 new counties; considerable spread southward.

1939

Infection on either pine or ribes had been observed throughout all important white pine sections of the region. Found on Ribes nigrum in 10 new counties in Iowa and 12 in Ohio. Pine infections also located in two new counties in Ohio.

1940

Infection intensified in the northern part of the region.

1944

Rust continued to intensify and spread; pine infection found for the first time in five Iowa counties, marking a distinct southern extension.

1946

First pine infection reported in Illinois.

1947

Infection on natural white pine discovered in Indiana, thus completing the record of pine infection in the seven states in the region.

Infected pines found in one new county in Michigan, five counties in Wisconsin, two in Indiana, five in Illinois and one county in Ohio. Ribes infection reported in 53<sup>new</sup> counties in Southern Area, chiefly in Indiana, and 4 remaining counties in Michigan.

Rust had reached severe damage stage in northeastern Minnesota, advanced intensification stage in northern part of the Lake States and northeastern Iowa, and at least the introductory stage in the southern half of the region.

1948

Rust located initially on pine in one county each in Minnesota and Wisconsin.

1949

Rust discovered on pine in one county in Illinois, two counties in Minnesota and in four counties in Wisconsin.

1930

Rust detected initially on pine in one additional county in Michigan.

A cool, wet growing season favored the spread of the rust.

1931

Rust discovered on pine in another county in Michigan.

1932

Rust found initially on pine in one county each in Iowa, Michigan and Minnesota. To date, of the 622 counties in the region, the rust had been located in 192 counties on white pine.

Outbreaks of 1932 and 1933 again appearing in northern part of Lake States, indicating that those years were heavy wave years. High mortality of sapling pines evident in unprotected areas.



NORTHWESTERN REGION \*

1921

The introduction of blister rust in western North America is traceable to infected stock imported from France and planted at Point Grey near Vancouver, British Columbia, from which the disease spread by natural means into the northwestern United States. One infected pine found in a nursery in Skagit County, Washington. Infection abundant on European black currants in western Washington.

1923

Infected ribes found east of the dry belt in eastern British Columbia, and in Okanogan and Ferry Counties, Washington.

First pine infection occurred in Idaho (discovered in 1928).

1927

First ribes infection found in Idaho and eastern Washington.

Rust spread to northwestern Montana. Very favorable year for spread of the rust.

1928

First pine infection (1923 origin) located in the Inland Empire at Newman Lake, Wash.

1929

Pine infection (1923 origin) found at four different locations in north Idaho and numerous infected Ribes petiolare in northern Idaho.

1930

Large center of pine infection observed near Longacre, Mount Rainier National Park.

1931

Forty-five new pine infection centers found in northern Idaho and two in eastern Washington.

1933

Favorable year for spread of infection.

1934

Infection widespread throughout the Inland Empire. Many centers of 1923 and 1927 infection discovered as a result of the numerous workers in the field.

\*Designation changed to Northwestern Project in 1931

1937

One of the most serious blister rust wave years in the Inland Empire. Long distance spread from pine to ribes introduced the disease into all parts of the region, reaching almost to Yellowstone National Park. Where the rust was already established, considerable intensification eventually caused great damage to young white pine up to pole size.

1941

The normal wave of blister rust infection in the Northwest. The rust blizzard is explained by the favorable weather conditions and the very large number of infected ribes. The pine blizzard is explained by the long distance spread from ribes to pine with spreads of a mile or more.

1944

Rust on ribes found initially in Yellowstone National Park. First discovery of rust on pine possible in its natural habitat and also first pine location west of the Continental Divide at Two Medicine Lake, Glacier National Park, Montana.

1946

Infected ribes located 6 miles west of Jackson, Wyoming.

1947

Infected ribes multicary were found in the vicinity of Blaine, Idaho, south of previously reported infection in Idaho.

1949

Rust was discovered on white pine for the first time in Park County, Montana, just 2 miles north of Yellowstone National Park.

Infected ribes were found in Fremont County, Wyoming, near Lander, an extension of 100 miles west and the ribes blizzard spread all the way to Jackson, Wyoming. Infected ribes were located for the first time east of Yellowstone Park.

1950

Significant damage in mature white pine appeared in Upper St. Joe River drainage.

Blister rust was found on white pine for the first time in Yellowstone National Park.

Infected ribes observed for the first time in Cascade County, Montana, extending known limits of the disease eastward.

1951

Rust was found on white pine in Carnelian Creek, Yellowstone National Park.

1962

Discovery of infected ribes extended known limits of the disease to the eastern border of Montana and southeastern boundary of Wyoming. This represents an eastern spread of 200 miles in Montana and southward of 125 miles to Laramie, Wyoming.

PACIFIC COAST REGION\*

1925

Infected ribes discovered in Northwestern Oregon.

1928

First infected western white pine found in Oregon at Mt. Hood.

1929

Infection on Ribes bracteosum located 50 miles north of the Oregon-California line in Curry County, Oregon.

1936

Rust reported on both hosts in California. First infection found on sugar pine in Oregon.

1937

Favorable year for asciospore dissemination and long distance spread on ribes in Coast Range.

1938

Moisture and wind conditions favorable for long-distance spread of the rust in the Sierra-Nevada.

1942

High intensification of the rust on ribes in northern California.

1944

Rust widespread on ribes in northern California.

1946

Rust discovered on sugar pines in Tahoe and Eldorado National Forests in California.

1947

Increased infection found on sugar pine on the Eldorado National Forest in California.

1951

Rust located on sugar pine on Stanislaus National Forest in Stanislaus County.

1952

Rust intensification on young sugar pines in northern California outside of control areas causing severe damage.

\*Designation changed to Pacific Coast Project in 1951







LAWS AND REGULATIONS



## FEDERAL LAWS AND REGULATIONS

1912

Federal Plant Quarantine Act effective August 20 provided authority for regulating the foreign importation and interstate movement of plants. Quarantine No. 1 under the Act relating to white pine blister rust was promulgated on September 16, 1912.

1917

Federal embargo placed on the movement of white pines and ribes from the western United States to points west of the Great Plains, to prevent the westward extension of the disease through the shipment of infected plants. (Quarantine No. 26, June 1, 1917)

1926

Embargo on the movement of white pines to points west of the Great Plains lifted after it became evident that the disease was established in the western white pine forests as a result of the introduction of the diseased pines into Vancouver, British Columbia, from France in 1910.

1933

Federal Plant Quarantine No. 25 provided for the importation of white pine green from seed under ribes-free conditions. (Effective January 1, 1933)

1946

Federal Plant Quarantine No. 25 amended to permit the importation of white pine green from seed under ribes-free conditions, except that permits for the importation of white pine green from seed under ribes-free conditions are issued by States.

STATE LAWS AND REGULATIONS

Notes: Prior to the enactment of legislation with specific reference to blister rust control, preliminary work in the affected states was conducted under the authority of general plant pest control laws, principally in connection with nursery inspection activities.

NORTHEASTERN REGION

1917

Maine: Commissioner of Agriculture authorized to designate control areas and promulgate quarantines. Infected white pines and ribes declared a public nuisance and destruction authorized. Right of entry on private property and cooperation with the federal government authorized. Provision made to compensate for uninfected host plants destroyed. (Revised statutes of Maine, 1944, Chapter 32, Sections 53-58 incl.)

New Hampshire: State Forester authorized to designate control areas, within which destruction of ribes and infected pines authorized. Right of entry provided. Towns required to perform control work to the extent of expenditure of \$400 upon order of the Governor. Compensation provided for uninfected hosts removed. (Revised statutes of 1949)

Massachusetts: State Nursery Inspector (Director, Division of Plant Pest Control and Fairs) and assistants authorized to enter private property and destroy host plants. Compensation provided. Chapter 133 General Laws of Massachusetts 1932, as amended in 1938, 1939, 1941 and 1948)

Rhode Island: Ribes declared a public nuisance and suppression by the Division of Entomology and Plant Industry authorized. Right of entry granted. Compensation provided for uninfected host plants destroyed. (Chapter 229, General Laws 1938)

Connecticut: Director, Connecticut Agricultural Experiment Station or agents authorized to destroy infected host plants within designated districts. Right of entry provided. Penalty for growing Ribes nigrum. (Chapter 146, Sec. 3251, 3253, 3254. Revised statutes of 1949)

New York: Commissioner, New York Conservation Commission authorized to suppress and control blister rust. Ribes nigrum declared a public nuisance. Fruiting current districts defined, control measures defined for fruiting current districts and outside the same, planting of host plants regulated, authority to eradicate host plants provided, compensation for host plants destroyed authorized, quarantine authority delegated. (Chapter 221, Laws of 1917 as amended through 1948)

1918

Massachusetts: Quarantine order issued September 18 prohibiting the entry of ribes. Regulation issued forbidding the planting of ribes in 20 towns designated as demonstration control areas. Restriction applied to additional towns (203 by 1941) as control work progressed.



1929

New Hampshire: Entire state south of certain northern towns declared control area. (Order of 1917 supplemented 1918 and 1928)

Rhode Island: Transportation, importation or planting of host plants allowed only under permit. Ribes nigrum declared a public nuisance, possession prohibited and destruction without compensation authorized. Control area established and possession of ribes therein prohibited. (April 1, 1928 as amended October 1, 1936)

1930

Massachusetts: Regulation issued declaring Ribes a plant subject to destruction under authority of the general laws.

1931

Connecticut: Control areas established around apple nurseries and in apple yards. (Executive Order No. 93 and Control Area Orders, 1931 and 1932)

1932

Minnesota: Commissioner of Agriculture authorized to designate control areas, destroy host plants and prohibit planting of ribes within specified distances. Right of entry provided and compensation for destroyed cultivated plants. (Title 19, Public Laws, Revision of 1947)

1933

Washington: Infested host plants declared a public nuisance and destruction by agents of the Department of Forestry and Nature authorized. Establishment of feeding expert and nursery area and control areas provided. Ribes also authorized for unfettered collection and ribes destroyed. (House of Representatives Assembly No. 44 P. L. 61 - April 24, 1933)

1933

Massachusetts: Regulation established the control area, right of entry of ribes, and prohibited plantings. R. nigrum and R. rubrum plants within one mile of pine-producing nurseries. (January 15, 1933)

1933

New Jersey: Provision made for determination of dangerous plant diseases, declaring epidemics, right of entry and issuance of quarantines. (Title 4 of Revised statutes, P. L. 1933. Chapter 7 Articles 1 and 2)

State Board of Agriculture: Regulation established control area and ribes planting of ribes prohibited. (December 21, 1933)

1943

Massachusetts: Regulation after destruction of ribes prohibited transportation or further planting of ribes prohibited.



1948

New York: Fruiting currant districts and blister rust quarantine district established. Possession of ribes in quarantine district prohibited.

1952

Massachusetts: Statutory authority for conduct of blister rust control transferred from the Director, Division of Plant Pest Control and Fairs in the Department of Agriculture, to the North Superintendent in the Department of Conservation. (Chapter 480, Acts of 1952 - effective July 1, 1952)

Virginia: Responsibility for blister rust control work transferred from the State Entomologist in the Department of Agriculture to a new Division of Forest Insect and Disease Investigations in the Virginia Forest Service.

## 1909

## 1912

State Department has established State Crop Pest Commission with powers to regulate, control, and enforce regulations necessary to eradicate injurious insects and plant diseases. (State Crop Pest Commission Act of General Assembly) No regulations have been issued relating to white pine sawfly larvae.

## 2210

## 1917

## 2023



1935

Delaware: Law directed State Board of Agriculture to "seek out and suppress" all injurious insects, pests and diseases and provided that remedies and control measures shall be proscribed. Right of entry provided. (Chapter 1, Article 1, Sections 4 to 16, 566 of the revised Code of Delaware, 1935)

1937

Georgia: State Entomologist vested with power to declare insects, plant diseases and host plants public nuisances. (The Entomology Act of 1937)

1941

Tennessee: Rules and Regulations declared white pine blister rust to constitute infection in trees. (June 1941)

State Quarantine No. 1 revised June 1941 authorized establishment of control areas and eradication by authorized agents, of all ribes therein. Planting and transportation of ribes allowed only under permit. Infected pines subject to destruction when less valuable than neighboring ribes.

1943

Virginia: Dissemination, growing or other uses of all species of ribes and movement of white pines prohibited in all except seven non-pine growing counties. (Notice of Quarantine No. 3 - 2nd revision)

1944

West Virginia: Control areas established around two nurseries. Planting of Ribes nigrum within one mile nor any ribes within 1,500 feet of the areas prohibited. (Notice of Quarantine No. 5, First revision, by Commissioner of Agriculture)

Delaware: Entire state declared a control area. Importation of ribes prohibited. Propagation and transportation of ribes prohibited, except under permit in the southern part of the State. Authority given to destroy ribes, when in the opinion of the State Plant Pathologist they are a hazard to valuable white pines. (Rules and Regulations of State Board of Agriculture for Control and Suppression of the white pine blister rust)

1945

Maryland: Blister rust control areas established. Growing of Ribes nigrum prohibited within one mile and any ribes in 1,500 ft. zone surrounding each area. Possession, transportation, planting, selling or offering for sale any ribes plants or parts thereof, prohibited within any control area. Authority for destruction of ribes provided. Compensation for uninfected plants authorized. Infected ribes declared public nuisance. Cooperation with the federal government and other State departments authorized. (Rules and regulations by State Board of Agriculture)

1943 control

North Carolina: Commissioner of Agriculture authorized to designate control areas; all imported and indigenous vines in control areas require public inspection. Authority to destroy vines provided. Planting of vines and planting of vines in control areas forbidden except under permit. Destruction of white vines authorized under certain conditions. Control area established by order of June 24th. (Quarantine No. 2 revised by Commissioner of Agriculture 1943)

West Virginia: Silver rust declared to be a dangerously injurious plant disease. Regulation by Commissioner of Agriculture defines damage by the various insects and plant diseases.



NORTH CENTRAL REGION

1927

Illinois: Right of entry provided. All trees infected with plant disease liable to spread to other plants declared a nuisance. Notice to owner to abate; upon failure to comply, abatement to be made by Department of Agriculture with assessment of cost to owner. (The Insect Pest and Plant Disease Act)

Indiana: Department of Conservation authorized to declare as an infested area, premises upon which destructive plant disease is found. Owner required to destroy infested products in accordance with instructions. If owner neglects to conform, department authorized to take necessary action and assess costs as taxes. Cooperation with federal government authorized. No rules and regulations relating to blister rust issued.

Iowa: State Entomologist required to list dangerously injurious insect pests and disease, such pests and diseases declared public nuisances, subject to destruction. Owner required to eradicate infected plants upon notice. Upon failure, authorized agents may destroy plants, cost to be assessed after notice and hearing. Right of entry authorized. (Iowa Crop Pest Act. Chapter 68 Laws of the 42nd Assembly. Chapter 201-B1 Code of Iowa, 1927 Sections 5, 6, 7, 14, 17.)

1929

Michigan: Infected white pines or ribes declared a public nuisance and subject to destruction. Uninfected plants may also be destroyed. Ribes nigrum declared a public nuisance; possession prohibited and plants subject to destruction. Commissioner of Agriculture empowered to designate areas for fruiting ribes and for white pines. Commissioner authorized to require owner to perform control work and upon failure to comply, expense to be charged as a lien. Compensation provided for infected pines and ribes destroyed. Cooperation with federal government authorized. (Act No. 313. Public Acts of 1929)

Fruiting ribes areas and blister rust control areas established. Free movement of ribes (except Ribes nigrum) allowed into fruiting ribes areas, but permit required for movement into control areas. (Regulation No. 608)

Minnesota: Infected white pines and ribes declared public nuisance, and subject to destruction by Commissioner of Agriculture or his agents. Uninfected plants may also be destroyed if necessary. Commissioner may designate control areas. Land owner within control area to perform control work upon order of the Commissioner. Upon failure to comply, expense of removal assessed as a lien. Compensation for uninfected ribes authorized. Right of entry provided and cooperation with the federal government authorized.

1935

Wisconsin: Department of Agriculture authorized to issue regulations needed to prevent dissemination of plant diseases. Right of entry provided. No



1935 cont'd

is a carrier of a dangerous plant disease. Entomologist of the Department authorized to destroy such plants. If owner fails to destroy such plants

No provision for compensation for bushes destroyed. (Chapter 93, Section 93.07 (1) and (12), Chapter 94.53 and 94.54 Wisconsin Statutes.

1936

Illinois: Ribes nigra designated a host of a dangerous disease. Ribes nigra designated for eradication without compensation. Ribes nigra designated as a pest in which all ribes shall be destroyed with the exception (General Order No. 3E, by State Board of Agriculture)

1939

Illinois: Control areas designated. Prohibited planting and possession of all ribes within such areas and within 1,500 feet of pine-producing areas within one mile thereof. All ribes in such areas considered a potential menace and destruction authorized. Replanting of ribes prohibited. (Regulations concerning the establishment of blister rust control areas)

1941

Ohio: Director of Agriculture and his agents authorized to inspect for infestations of harmful insects and plant diseases; prescribe and enforce measures deemed necessary to eradicate outbreaks. Power provided to order owner to destroy plants within 7 days and upon non-compliance, assess costs as taxes. No compensation provided. (Plant Pest Law, Sections 1127, 1130 incl. and 1132 of the General Code)

1942

Ohio: Permit required for intrastate shipment of white pines. Ribes nigra declared public nuisance and possession, transportation, propagation, or sale of plants of such species prohibited. Director of Agriculture or agents authorized to destroy ribes. Chief of the Division of Plant Industry authorized to designate State Forests, State and Municipal Parks and native white pine areas as control areas, in which ribes considered potential menace and destruction authorized. (Regulations for control of white pine blister rust - first revision)

1946

Minnesota: Control areas established and planting of ribes therein forbidden except upon written consent of Director of Division of Forestry. (Blister Rust Control Order No. 4)

1949

Wisconsin: Ribes may be shipped or moved within control areas only under (Regulation No. 1)

NORTHWESTERN REGION

1926

Montana: Ribes nigrum proclaimed a public nuisance; possession of such plants unlawful; and state-wide destruction by Horticultural Inspectors ordered. (State Quarantine No. 3A)

1927

Washington: Owner required to prevent infection by all plant diseases. If disease found, plants to be eradicated. All fungous diseases declared injurious pests and spraying specified as required control measure. Quarantines authorized but revoked upon passage of Federal Plant Quarantine No. 63. (Quarantine Laws under Revised Statutes, Sections 2842, 2843.)

1932

Idaho: Owner required on notice by Inspectors of the Department of Agriculture to eradicate any injurious tree diseases. Upon failure to remove diseased trees, expense charge as lien. Quarantines promulgated but revoked upon passage of Federal Plant Quarantine No. 63. (Idaho Code Annotated - 1932, Section 22-1501 to 1506 incl.)

1935

Montana: Governor empowered to designate areas in which any plant disease inimical to agriculture is present and prohibit shipments of plants therefrom. Governor may quarantine any county found infected, prescribe and enforce rules and regulations. (Chapter 306, Revised Statutes of 1935, Sections 3631 and 3632)

PACIFIC COAST REGION

1929

Oregon: Department of Agriculture authorized to establish control areas. Department to specify plants to be eradicated. Ribes nigrum declared to be a public nuisance, possession unlawful, and Department Inspectors authorized to abate the nuisance. (Chapter 181, General Laws of 1929, as later amended, Sections 35-401-6)

1930

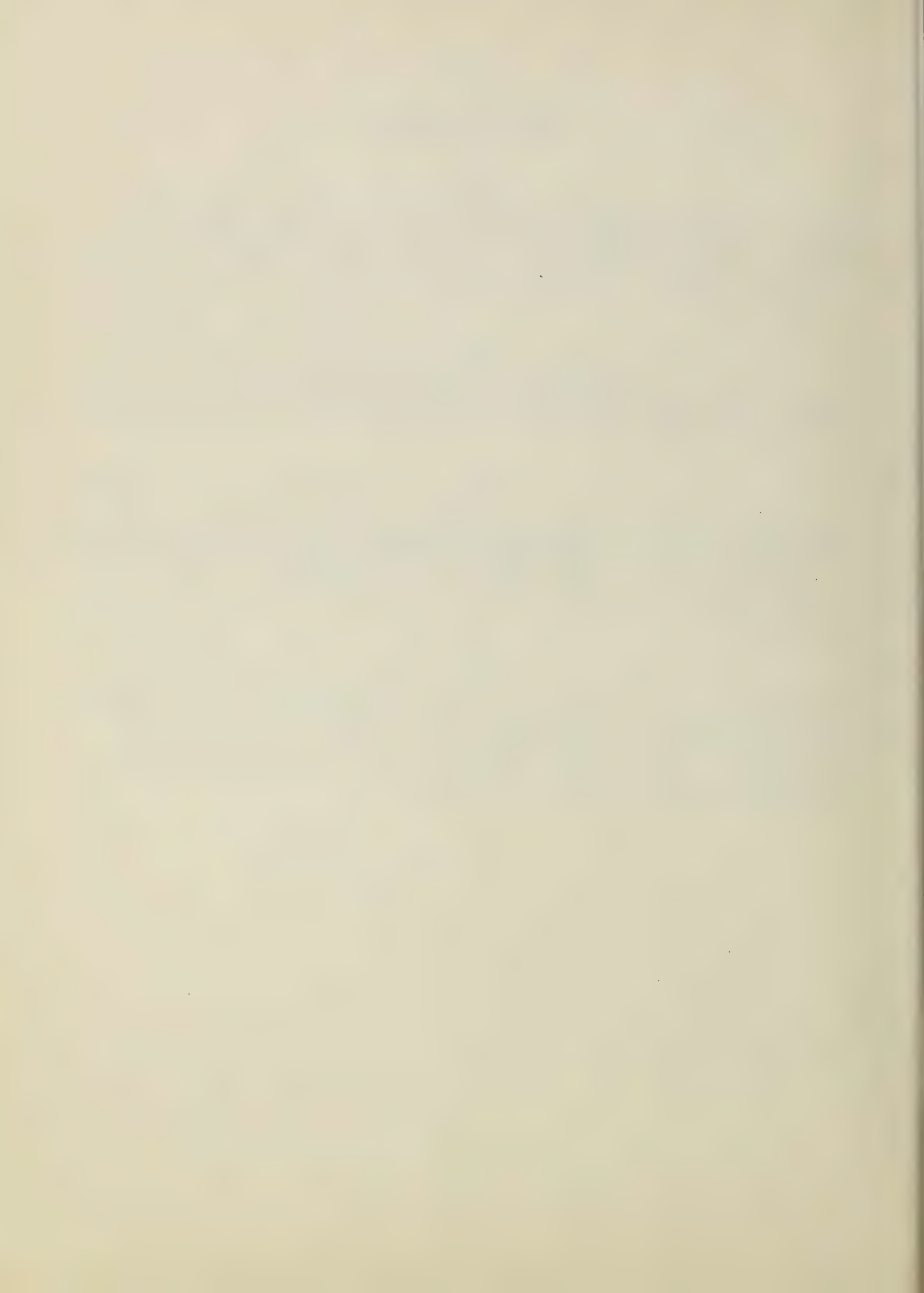
Oregon: Control areas established. Unlawful to transport host plants into control areas without permission of State Board of Agriculture. Unlawful to grow ribes within areas. (Control Area Orders Nos. 2, 15 and 16 by Oregon Board of Horticulture)

1933

California: Director of Agriculture may establish quarantine regulations, make and enforce rules. Ribes nigrum and all other ribes, wild and cultivated, when growing in control areas declared a public nuisance, and Director and Commissioner may abate menace. Unlawful to grow any species of ribes in quarantined areas. (Agricultural Code, Chapter 25, Statutes of 1933, Sections 106, 108, 160)

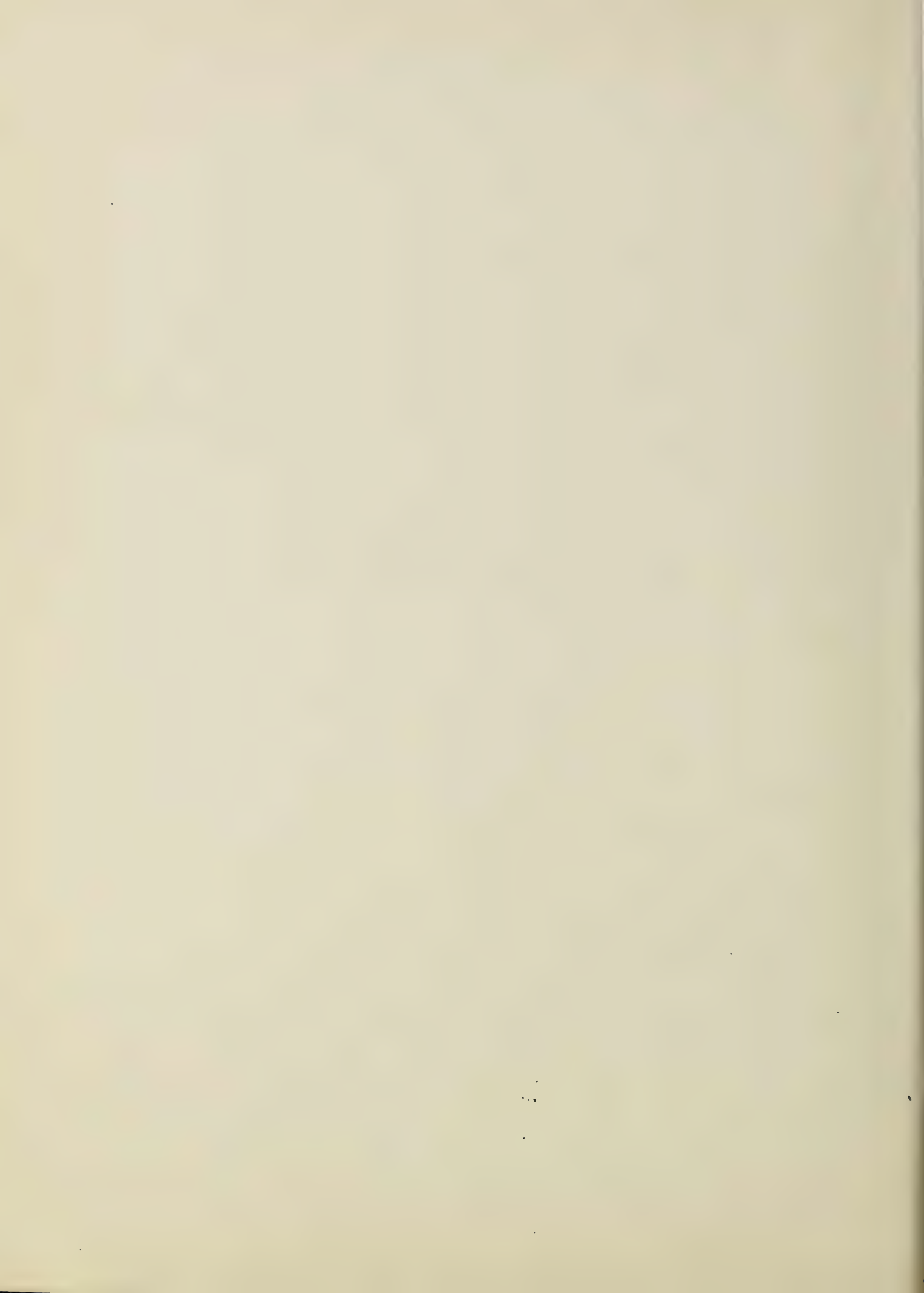
1946

California: Quarantined or infected areas prescribed. Movement of five-leaved pines from quarantined areas prohibited except under permit. Movement of Ribes nigrum within the state prohibited. Movement of ribes, other than R. nigrum, in certain control areas prohibited. (Quarantine Regulation 3 White Pine Blister Rust Interior Quarantine)





GENERAL POLICY, ORGANIZATION AND FINANCES



GENERAL POLICY, ORGANIZATION AND FINANCESAPPLICABLE TO ALL REGIONS1921

Federal funds for cooperative ribes eradication on dollar-for-dollar matching basis terminated June 30 by ruling of the Secretary of Agriculture. Subsequent Federal funds limited for leadership, informational and service purposes.

1933

Government relief programs-Emergency Conservation Work (ECW) and National Recovery Administration (NRA) inaugurated in all regions.

The administration of the Federal blister rust control program was transferred December 1 from the Bureau of Plant Industry to the Bureau of Entomology and Plant Quarantine (officially effective on July 1, 1934).

Federal Plant Quarantine revised to permit shipment of blister rust-free plants from the infected states, when grown from seed after compliance with sanitation measures involving the destruction of all ribes within 1,500 feet and all European black currants within one-mile of the applicant nursery.

1934

Large-scale Public Works Administration (PWA) and NRA projects in progress.

1935

All projects discontinued and PWA projects initiated. Collaboration with National Youth Administration (NYA) in the employment of youths.

1936

All cooperative agreements with the states revised, revised, revised, revised in the Bureau of Entomology and Plant Quarantine for the coordination and prosecution of control activities.

1937

New Memorandum of Understanding between the U. S. Forest Service and the Bureau of Entomology and Plant Quarantine, 1937, for the management of control operations to the Forest Service and the responsibility for the general planning, coordination, and general direction of the work to the Bureau.

1938

Federal Plant Quarantine modified, placing the responsibility for eradication on state agencies.

1940

Holding program conducted in all regions in cooperation with the States and local cooperators.

1941

Beginning of World War II. Holding programs continued.

Passage of Lea Act effective July 1 permitted broader participation in control work on state and private lands by providing federal funds to supplement state, county, city, town and private monies. Bureau responsible for leadership, coordination and technical direction of all work.

1942

Emergency unemployment relief programs terminated.

1945

40-hour work week established by federal statute.

1946

Substantial increase in federal funds permitted much needed expansion of operations.

Use of contract system in ribes eradication work initiated.

"Safety and Health" Manual issued.

1947

Drastic reduction in Lea Act funds for work on state and private lands after July 1.

1950

Preliminary actions toward the complete reorganization of the administration of the project on a new regional basis.

1951

On July 1, the Bureau of Entomology and Plant Quarantine was reorganized to conduct its control, regulatory and field administrative (business) activities through five regional offices with a Director in charge in each. The blister rust control program was reorganized to function in three of the new regions, namely; Region I-Northeastern, with headquarters in Greenfield, Massachusetts; Region V, with headquarters in Minneapolis, Minnesota; and Region IV, with headquarters in Berkeley, California.



1951

Operation of the project in all regions investigated by a special group  
appointed by the Secretary of Agriculture to review the progress of  
the wheat control program administered by the Bureau of Entomology  
and Plant Quarantine.

1952

The operation of the wheat control program in all regions investigated  
by the special group assigned to the project in each region.

NORTHEASTERN REGION

1902-1912

State Nursery Inspectors and State Forestry officials attempted to locate and destroy all specimens of imported white pine stock.

Federal Quarantine (No. 26) regulating importation of ribes and white pines promulgated (November 1912).

1913-1915

Intensive effort by State officials in collaboration with the Bureau of Plant Industry, U. S. Department of Agriculture, to eradicate the disease by cutting out cankers and through the destruction of imported white pines in nurseries, plantations and ornamental trees. Infected ribes eradicated in commercial nurseries and all ribes from a few infested pine plantations and surrounding protection zones. Work reached a peak in 1915 when all imported white pines in several nurseries were destroyed. In New York 1,800,000 trees were destroyed and 300,000 in Massachusetts.

Efforts at eradication of the disease were abandoned in 1915 in favor of a program of control through the eradication of ribes, the disease having spread to native white pine and ribes.

1916

Federal funds provided for field investigations by the Bureau of Plant Industry.

Funds for experimental control work appropriated by the federal government and by the states of Massachusetts and New York.

Ribes eradicated from barrier zone along Massachusetts-New York boundary and from an immune zone surrounding western border of infested area in Columbia County, New York. Also, between New York and Ontario, Canada.

Extensive scouting for infection on native pines and ribes in New England and New York.

1917

Work in barrier zone to prevent spread of the disease discontinued; possibility of elimination abandoned.

Beginning of World War I.

First regional conference of State cooperators, federal representatives and others at Amherst, Massachusetts (July 17-18). Conference opinion that disease too widespread for extermination; recommended experimentation and investigation to develop efficient and effective control methods.

## 1917 Cont'd

Conference of the Committee on the Suppression of Pine Blister Rust in North America, held in Pittsburgh, Pennsylvania, Nov. 12-13.

Deliveries of seedlings to pine plantations authorized. State contributions were as follows: Massachusetts - \$50,000; New York - \$46,236; New Hampshire - \$28,000 for 3-year period; Connecticut - \$5,000 for 1917; \$7,000 for each of following two fiscal years; Rhode Island - \$5,000. Similar amounts made available in Rhode Island and Vermont.

Connecticut legislation authorized Director of Agricultural Experiment Station to destroy host plants to control the disease.

Massachusetts legislation authorized control work under the direction of the State Nursery Inspector.

New Hampshire legislation authorized Forest Commissioner to establish control areas.

New York legislation authorized control work by fire owners eradicating ribes on their individual properties in New Hampshire.

European black currant declared a "public nuisance" in New York. Local demonstration areas established in New England States and New York.

Systematic records of ribes eradication work started.

Federal inspection of control work inaugurated.

## 1918

State Nursery Inspector in New Hampshire prohibited operations involving removal of pines and cultivated ribes and prohibiting interstate shipment of ribes.

State Nursery Inspector in Massachusetts prohibited export of pines except under permit.

Demonstration area for ribes eradication established in Vermont. Private.

First own cooperation in New Hampshire; 40 acres appropriated for control work.

Local control policy started in New York.

Initiative Federal policy of local control, including inspection, regulation in cooperation with state agencies.

Conference of Committee on Suppression of White Pine Blister Rust in North America, convened at Boston, Massachusetts (Nov. 11-12). Conference present from 12 states, Washington, D. C. and Canada.

Acute labor shortage due to World War I.



Northeastern Regional headquarters established at Cambridge, Massachusetts.

Increased town and private cooperation.

Field record system revised and simplified.

Federal demonstration control area established at Wolfeboro, N. H.

First test of inspection of express and freight organized by express at Springfield, Mass. to determine practicability of quarantine enforcement.

Federal type used in New England to control officials, at little ventilation work.

#### 1920

First inspection of express and freight organized to enforce federal quarantine.

#### 1921

Vigorous enforcement of federal quarantine extended to include parcel post; Blister rust personnel assisted in transit inspection.

Eradication costs reduced to 24¢ per acre representing a steady decrease from first costs of 74¢ in 1917.

#### 1922

Eight-year program instituted on basis of federal, state, and private owner cooperation. State and District Leaders appointed as federal agents; Federal responsibility under cooperative agreements restricted to development of control methods, where investigations and surveys, extension service, project coordination and inspection of control work to insure effective results. State cooperators responsible for supervision of district leaders. Extension Service added as cooperating agency in educational work.

Participation by towns and individuals greatly increased, providing the responsibility of cooperation. First experimental station established in 6 towns appropriated; also in Connecticut.

#### 1923

Regional conference of Federal administrators and leading personnel, state cooperators and others at Boston, Mass. (Feb. 1-23).

Technical (refresher) courses for leading personnel under the direction of Dr. H. L. York, held in Maine, Massachusetts, New Hampshire and New York.

Three Federal sub-districts established throughout the region.



1923 Contin.

State blister rust control policy developed in Maine.

Work plan prepared for eight-year control program in Massachusetts.

First rework in the region performed on 21,873 acres at cost of 13¢ per

1924

First control work on U. S. Forest Service land on the White Mountain National Forest.

First nursery sanitation work at Clearfield, Pennsylvania.

State raised legislation to control importation of rife and place under permit system.

Control work organized in Pennsylvania.

First town appropriation in Vermont (Thetford-\$100)

1925

Town funds for control work in New Hampshire turned over to the State for use where needed within town limits.

Federal "Specialists" positions eliminated.

1926

Regional Conference of all field personnel held at Albany, New York (Dec. 9-10)

Average initial eradication cost of 16.6¢ per acre attained.

1927

Destruction of European black currants authorized in Massachusetts.

1928

First control work performed in New Jersey.

Reports for E. algon in Vermont, Massachusetts, New Jersey and New York

First control work in Pennsylvania on State lands.

1929

Control work initiated on Federal land on the White Mountain National Forest in Pennsylvania.

Connecticut legislated against the European black currant.

1929 Cont'd

Compulsory appropriation of town funds for control work provided for in New Hampshire legislation.

First county appropriation for control work (New York).

"Hewitt" Law passed in New York authorizing purchase and rehabilitation of abandoned lands, forest growth, and protective measures.

Eradication of European black current started in Rhode Island.

1930

Compulsory appropriation law in New Hampshire enforced in 40 towns.

Eradication of European black currants initiated in Connecticut.

Beginning of the depression period.

1931

Eradication of European black currant eradication program started in Rhode Island.

First control work in New York under Hewitt Reforestation Law.

Control policy in Maine revised to permit use of town funds for hire of local crews rather than to use town foremen to work with individual cooperators.

Control policy in Rhode Island revised to the Department.

Rework program in the region expanded.

1932

Low point in depression reached; drastic cuts in town appropriations; relief labor used for the first time. Forest earnings (\$11,000) since the experimental period.

Stumpage price of pine dropped to a low of \$2 and \$3 per M.

Enforcement of New Hampshire compulsory appropriation law deferred because of the depression.

1933

Development relief program (CCC and NRA) inaugurated with a party of 134 Civilian Conservation Corps (CCC) men and 1,000 acres; the program not organized until late in the season (September).

Large scale mapping project started, using CCC and NRA labor.

Eradication of the European black currant completed in Rhode Island.

1933

Sharp rise in the number of fires (9 to 23) and cost (24¢ to 48¢) as emergency relief labor (especially CCC crews) worked high fire populations.

1934

Large scale PWA project inaugurated; continued work on CCC from 125 camps with 2,485 men; and began Emergency Relief Administration (ERA) program.

All-time low for town appropriations (13 for \$4,574).

1935

CCC force increased while NRA and ERA personnel decreased. WPA control program initiated in July. A total of 8,206 persons employed on combined projects. Area worked exceeded the million acre (1,125,168) mark.

Business functions of the region transferred from Washington, D. C. to Cambridge, Massachusetts.

Town appropriations increased in substantial amounts.

Bilias nigra eradication completed in Connecticut.

1936

All-time peak employment (8,728 workers) through expanded WPA program, and continuation of ECW. In addition, small projects in cooperation with the Agricultural Resettlement Administration (ARA), Soil Conservation Service (SCS) and National Youth Administration. All-time production record of 1,784,378 acres, including peaks in both initial and rework.

Large mapping project started.

State WPA project in Connecticut.

New low in regular cooperative program funds.

1937

Small reduction in man days for Bilias eradication (1,000,000 to 800,000), resulted in 60% drop in coverage.

State and local WPA projects in Connecticut and New York.

1938

New England hurricane of September 21, resulted in 50 percent or more blow-down of 2.5 billion bd. ft. of timber on 800,000 acres. About 80 percent white pine, white fir in other species. General possible greatly damaged as a result of the disturbance of forest floor and canopy. Good seed crop allowed to insure reproduction. Bill for forest control program assistance (New England Timber Salvage Legislation - NE-TSA) is a series of measures aimed especially at the salvage of seedlings of white pines provided by the Bureau of Entomology and Plant Quarantine.

1938 Cont'd

State WPA projects in Connecticut and Pennsylvania.

1939

Mapping of hurricane areas in cooperation with NETSA expanded.

Extensive salvage of blown-down timber results in large increase in output.

New permanent map and record system (CO-106) devised.

tes nigrum eradication completed in Massachusetts.

1940

Increased output of blown-down timber stimulated by increased war-time demand for lumber.

Pine protection standards adopted.

Work done on removal of locations where tes nigrum had been destroyed.

1941

Accelerated cutting of white pine continued.

"Maintenance" designated as a control condition class.

1942

Production of lumber by private industry during the first four war years and accelerated cutting of white pine.

Problem complicated by increased costs of labor and materials, rates, travel restrictions, and shortages in replacement.

High School boys and older men used to relieve the critical man-power shortage.

Measured general checking procedures adopted.

1943

Production of lumber by private industry during the first four war years and accelerated cutting of white pine.

Five-year plan.



1945 Cont'd

Control costs increased due to extension of annual and sick leave rights to w.a.e. personnel. Acute labor shortage. Smallest coverage (361,643 acres) since 1932.

1944

Plans initiated for the use of aerial photographs in mapping.

The lead in white pine production shifted from New Hampshire to Maine.

Increased use of white pine for paper pulp resulted in increased cutting of immature pine, thus intensifying the blister rust control problem.

Largest regional cut of white pine (905.8 million bd. ft.) in 30 years.

Expanded operations and improved methods resulted in the largest coverage since the emergency-period peak in 1936.

Southeastern Massachusetts visited by a hurricane, severely damaging white pine stands in a limited area.

Man-power shortage acute.

District Leaders assisted Timber Production War Project in connection with speeding up production of lumber, pulpwood and other forest products.

1945

Labor shortage continued.

Entire control acreage in Rhode Island classed as on maintenance.

1946

Substantial increase in federal funds permitted much needed expansion in operations.

E. L. Joy appointed Assistant Regional Leader.

State funds in New York increased from \$22,000.00 to \$83,000.00 as the first step in meeting full program needs.

Largest cut of white pine in the region in recent times.

Entire control acreage in Connecticut placed on maintenance.

1947

Drastic cut in federal funds - fiscal year 1948.

State and local funds increased 40 percent over 1946, especially in New York, New Hampshire and Pennsylvania.

In Pennsylvania, state funds were increased from \$5,000 to \$30,000 to begin a full-scale program to attain a 90 percent maintenance of control status by 1949.

1947 Cont'd

Disastrous forest fires in Maine and New Hampshire in October burned over 250,000 acres. In Acadia National Park in Maine, 45 percent of the control area devastated.

Instruction in blister rust and its control initiated in forestry schools in New York.

1948

Cooperative funds further increased while federal funds remained at about the same inadequate level.

Analysis made for each state showing status of control, future needs and costs. Connecticut and Rhode Island on maintenance with adequate financing; New York, Pennsylvania and Massachusetts adequately financed; and Maine, New Hampshire and Vermont under-financed.

Permanent status record system revised (NE-5) to include "time-table" for scheduling future work.

Decline in lumber and pulpwood production.

1949

Standards established for use in determining when areas are ready for maintenance classification.

First step toward reorganization of the project designated the states of New York and Pennsylvania as an Area with the appointment of an Area Leader (Clave) in charge.

Area covered, once again exceeded a million (1,010,688) acres.

1950

Administrative and supervisory set-up reorganized involving the abolition of seven State Leader positions and the substitution of three Area Leader positions. Regional office moved from Cambridge, Massachusetts to Greenfield, Massachusetts. Part-time service of District Leaders in New Hampshire on fire-protection work discontinued.

"Great storm of 1950" causes heavy damage in New York.

Substantial increase (612,418 acres) in area on maintenance.

1951

Southern Appalachian States incorporated in the reorganized Northeastern Region (Bureau region I).

All administrative functions handled by the Bureau Administrative Unit at Greenfield, Massachusetts beginning on July 1.



1951 Cont'd

Another substantial addition (643,721 acres) to the maintenance class.

Operation of the project investigated by a special group appointed by the Secretary of Agriculture to study all insect and plant disease programs administered by the Bureau of Entomology & Plant Quarantine. Information presented to the committee based on an analysis of the status of control, future needs and yearly costs to establish and maintain control of the disease in the region.

A few changes in headquarters of the District Leaders were made to conform with departmental policy to consolidate offices at the county level.

All-time high of \$358,555 in state and local direct aid. This represented \$244,555 in excess of Bureau allotment for ribes eradication work on state and private lands.

Part-time service of District Leaders in Vermont on fire prevention, discontinued.

1952

Improved bookkeeping procedures in Administrative Unit permitted ready determination of balances of federal funds in each cooperating state.

Southern Appalachian States classified as an Area in the Northeastern Region and sub-divided into three districts with the assignment of Control Aides as needed.

Area Leader Clave (New York - Pennsylvania Area) promoted to Assistant Regional Project Leader and replaced by an appointee from the Gypsy Moth Control Project.

Forester on the George Washington National Forest assigned to assist in the correlation of blister rust control with forest management on the Forest.

Responsibility for control work in Virginia transferred from the State Entomologist in the Department of Agriculture and Immigration to a new Division of Forest Insect and Disease Investigation in the Virginia Forest Service.

Responsibility for control work in Massachusetts transferred from the Division of Plant Pest Control and Fairs in the Department of Agriculture to the Office of Moth Superintendent in the Massachusetts Department of Conservation.

Federal quarantine amended to permit shipment of white pine into Kentucky, South Carolina and Tennessee.

Acreage covered, again exceeds a million (1,007,285) acres. Acreage on maintenance increased another 5 percent.

SOUTHERN APPALACHIAN REGION

1920

Eradication of Ribes nigrum in Delaware.

1922

First wild ribes eradication in the region performed by the State Forestry Department of Maryland; State Forest in Garrett County.

1929

First ribes eradication by the Bureau of Plant Industry on the George Washington National Forest in Virginia and in the environs of the Forest Service Nursery in West Virginia.

1932

Nursery sanitation work performed in Delaware, Maryland, Virginia and West Virginia.

First ribes eradication work performed on private lands in Virginia.

1933

Start of emergency unemployment relief work under ECW and NRA programs in seven states.

Most of the work was on federal lands, with some work on state and private lands in Maryland.

1934

FWA work extended into eight more states on private lands in cooperation with state officials.

Region reorganized on state basis with the appointment of state leaders and field agents.

1935

FWA project discontinued. WPA project started in seven states.

First canker elimination work performed on the Shenandoah National Park in Virginia.

Regional headquarters moved from Washington, D. C. to Richmond, Virginia.

1936

Peak year of control operations under ECW and WPA programs. Over a million (1,004,834) acres worked.



1938

Control work started in Delaware.

J. C. Ball transferred from Pacific Coast Region as Assistant Regional Leader.

1939

Permanent control record system initiated.

1941

Permanent control record system officially in operation.

Regular funds allotted under the Lea Act for cooperative work on state and privately-owned lands.

Changes in organization suggested.

1942

First allotment of funds by the U. S. Forest Service (George Washington National Forest in Virginia).

Field records revised and simplified.

1943

Reorganization of the Region on Area basis initiated through changes in personnel in Virginia and West Virginia.

Control work resumed on National Park lands with Civilian Public Service workers.

1944

Reorganization officially approved. Areas No. 1 and 2 established with Area Leader and Assistant Area Leaders in each.

Regional headquarters moved from Richmond, Virginia to Harrisonburg, Virginia.

Regional Leader Pierce retired and replaced by J. C. Ball on November 1. Initial control work 93.5 percent completed with 92.3 percent of the acreage on maintenance.

1945

Consolidation of Regional and Area Leaders' headquarters in Harrisonburg, Virginia.

Regional shop set up at Bridgewater, Virginia; mechanic appointed.

Uniform wage rates established for the Region.

1945 Cont'd

Final maintenance revised; lists of post offices revised by eliminating lists of post offices falling within the control areas.

1946

Final state office closed on completion of white pine survey and forest fires eradication.

Second work completed on Monongahela National Forest in West Virginia, placing the forest on maintenance.

1947

Conference of field supervisors, Bureau officials, State and U. S. Forest Service men to discuss operations on a full maintenance program.

Further reorganization contemplated by dividing the Region into four districts.

1948

All forest fires eradication work completed in southwestern Virginia, placing 16 counties on maintenance.

All secondary fires eradication completed in Kentucky and South Carolina placing the two states on maintenance.

All primary fires (George Washington) of the pine National Forests in the control area in the region on maintenance.

1949

Maintenance organization gradually developing. Regional Leader Bell went on leave for 30 days of absence. Area leader being an extended absence. Duties of these men absorbed by Acting Regional Leader and Assistant. Regional Leader. Permanent personnel reduced from 20 to 17. Regional shop at Bridgewater, Virginia closed.

1950

First overnight audit by General Accounting Office, everything found to be in order.

Maintenance work plan for 10-year period prepared; recommendations made for organizing region into three districts.

1951

Regional Supervisor. Three incorporated in the regional maintenance Region (Bureau Region I).

NORTH CENTRAL REGION

1918

Legislation enacted authorizing control work by the Director of Agriculture and Markets in Wisconsin.

Agent (Winman) assigned by U. S. Bureau of Plant Industry for scouting and experimental work in Wisconsin.

1919

Plans changed from efforts to eradicate the disease by pine destruction, to control by the eradication of ribes.

1927

Permanent federal agent appointed to head up work in Michigan. Efforts concentrated on surveys for pine, ribes and infection, and on informational work.

1928

First local cooperative control project in Michigan (Indian River) under federal supervision.

1929

Blister rust laws enacted in Minnesota and Michigan.

Cooperative agreements signed between the Bureau of Plant Industry and State Agencies in Michigan and Minnesota.

Vigorous black currant elimination program and nursery sanitation started in Michigan.

Cooperative control programs initiated in Minnesota and Michigan, pine owners supplying labor for control work under state and federal supervision.

State Leader (Ritter) appointed in Minnesota.

1930

Control program adopted in Wisconsin and permanent State Leader (Kenba) appointed.

Educational activities in Michigan, Minnesota and Wisconsin increased.

Control economic depression.

During the decade ending in 1930, control work had been accomplished in Michigan, Minnesota and Wisconsin on 47,505 acres through the destruction of 8,103,808 wild roses, and 28,000 cultivated wild roses destroyed in elimination campaigns.



1931

Limited control program on account of the depression.

State cooperator (Mandenberg) functioned as State Leader in Michigan.

First control work in Illinois.

Increased attention to pine inventory and educational activities.

First blister rust conference held in Milwaukee. Control policy developed and uniform system of symbols, maps, records and reports adopted.

1932

Regional office established in Milwaukee and Regional Leader (Putnam) appointed.

Region embraced Michigan, Minnesota, Wisconsin, Ohio, Illinois, Indiana and Iowa.

Unemployment relief programs set up.

Memorandum of understanding drawn up between the Bureau of Plant Industry and the State of Illinois.

First cooperative control work in Illinois performed on the estate of Governor Lowden.

1933

Federal unemployment relief programs (ECW, NRA & CWA) started, greatly stimulating the control program through change from small cooperative projects to large scale operations.

Memoranda of understanding signed between Bureau of Plant Industry and State Agencies in Ohio, Indiana and Iowa.

State Leaders appointed in Ohio and Iowa.

First ribes eradication in Ohio, Indiana and Iowa begun.

Work on National Forests and Indian Reservations started.

Minimum size and stocking requirements set up for protection of pine. Full 900-foot protection zones used.

1934

Control work expanded with 2,928 persons employed on ECW, ERA, CWA and FEPA programs.

In general, ECW program was performed on public lands and the other programs on State and private lands.

Peak employment on ECW program.



1934 cont'd

Protective zone widths reduced in swamps.

Cultivated black currant elimination programs intensified in Michigan and started in Wisconsin and Minnesota.

Nursery sanitation work performed in 23 nurseries.

1935

Control efforts interrupted in mid-season by closing of blister rust project under FERA and NRA programs on June 30. Work resumed under WPA in August. CCC camps operated without interruption.

Regulation re control of blister rust promulgated in Ohio.

NYA boys employed for black currant work. Program started in Ohio and Iowa.

Ribes eradication extended into the dormant season; results unsatisfactory - too many missed bushes.

1936

Peak employment on WPA. By the end of the year, 54 percent of the million acres in the control area had been given initial protection; 41 white pine-growing nurseries worked; and most of the pine-growing counties had been cleared initially of Ribes nigrum.

Appreciable gain in controlling the disease made possible by abundance of labor and unfavorable conditions for the spread of the rust.

Driest in a series of dry years. Forest fires prevalent.

1937

Activities curtailed due to reduction in WPA funds, restrictions on employment of labor and keener competition for labor by other work projects.

Big reforestation program increased the white pine acreage needing protection.

Skeleton force of experienced field men retained through the winter for mapping, control zone boundary marking, canker pruning and transit inspection.

The removal of 247,000 plants of Ribes nigrum throughout the region appears to have checked the potential long distance spread of the rust to new locations.

Drought ended. Beginning of wet cycle.

1938

ERN and WPA provided most of the labor for control work.

-47-  
1939 Cont'd

Federal Quarantine No. 43 modified, placing responsibility for certification on state agencies. All 43 pine-growing nurseries granted pine-shipping permits under the provisions of the quarantine. Over 52 million white pines were growing in the nurseries.

Retention of skeleton supervisory force during the winter was very successful.

1939

ECW and WPA programs reduced as economic situation improves.

Increase noted in white pine reproduction due to increased precipitation.

1940

Higher standards for evaluating pine stands adopted, resulting in substantial reduction in acreage of white pine considered worth protecting.

Additional acreage reductions were made as surveys disclosed inaccuracies on early maps, and losses due to logging, fire and plantation failures.

Local control work continued chiefly with WPA, CCC, and NYA labor.

U. S. Forest Service decided to confine the growing of white pine nursery stock to a few selected nurseries that could be easily protected.

Nursery sanitation program practically on a maintenance basis.

1941

Federal agency WPA project ended on December 31. Operations changed to Bureau-sponsored projects within State WPA programs. CCC personnel decreased rapidly.

Employment under State and Regular funds largest in eight years.

Emphasis placed on informational activities to secure private cooperation.

War declared in December; regular and temporary employees left the project to enter armed services or private employment.

1942

Holding program adopted with care exercised to avoid interference with the war effort. Teen-aged boys, old men, and women employed. Number of workers reduced from 435 in 1941 to 222 in 1942. State WPA and Regular Cooperative Programs chief source of labor with lesser number provided by Indian Service, CCC, U. S. Forest Service, Counties, and Civilian Public Service (Conscientious Objectors).

Much cutting of immature pine for use in the war effort.

1943

Labor scarce and travel restricted. Protection given to stands where most



1943 Cont'd

needed; more rework than initial. Rust killing new white pine reproduction faster than it can be protected.

1944

Holding program continued. Evidence of much pine being lost due to the disease.

Ohio, Indiana, Illinois and Iowa organized into Southern Area.

Control work in Ohio and Indiana suspended for duration of the war.

Control work on prospective white pine sites discontinued until trees were planted.

1945

Regular personnel started to return from military service. Project experienced difficulty from competition with high wage rates paid by industry.

2,4-D tried as ribicide for first time.

1946

Increase in available funds permitted resumption of work on a more satisfactory basis.

Southern Area office established at Columbus, Ohio.

Control work resumed in Indiana and Ohio.

Current wet cycle that started in 1937 now in tenth year. Acreage of natural white pine reproduction increased annually due to favorable climatic conditions and more second growth trees reaching seed bearing age.

Drastic reduction in Lea Act funds for work on state and private lands after July 1; Forest Service funds somewhat reduced.

Enlistment of cooperation by pine owners stimulated and increased.

1948

More labor available generally; young men, with higher proportion of college students, used; Indian women continued to be employed on control work on Indian Reservations.

1949

Survey records by jobs analyzed to determine changes in white pine acreage from 1939 to 1949. Results show decrease in total pine acreage, but increases in better stocked stands, natural reproduction and plantations.

At the end of the 1949 field season, 75.6% of the control area in the region had been initially worked and 32.6% placed on maintenance.

1950

Leadership for the Southern Area transferred to the Regional office.

Direct aid by the states increased to an all-time high of \$80,928, while available federal funds for work on state and privately-owned lands decreased. The cooperative dollar in 1950 comprised 69 cents from the states and 31 cents from the federal government.

Extensive acreages discontinued in Ohio and Indiana by deleting unworked areas containing less than 5 acres of white pine or 2,500 trees.

1951

During the year many changes in status and location of regular personnel resulted from the Bureau reorganization which consolidated activities in each of five regions under a regional Director. The North Central states were included in Region 5 with headquarters at Minneapolis, Minnesota. Regional headquarters of the project were moved from Milwaukee to Minneapolis. These changes reduced the permanent blister rust personnel of the Bureau in the region from 22 to 14. Area leaders were assigned to Michigan, Minnesota and Wisconsin, and supervisors to Ohio, Illinois and Iowa.

1952

In a reappraisal, the present and potential commercial values of white pine in the region were estimated at \$460 million. White pine acreage still increasing due to continued regeneration and planting.

Contract ribes eradication was successfully initiated on the Nicolet National Forest, Wis.

Several permanent appointees worked temporarily on other Bureau projects, not only to assist but to broaden their experience.

State and private agencies contributed about two and one-third times as much as the federal government for work on non-federal lands.

In cooperation with the Forest Service, the method of determining white pine values by the stocked quadrat survey instead of count of pine trees was developed and used.



## NORTHWESTERN REGION

1922

Experimental manual ribes eradication work begun on privately-owned land near Elk River, Idaho.

Western Branch of Ribes established at Seattle, Washington.

State Quarantine on Ribes nigrum promulgated in the Pacific Northwest.

1923

Western Branch office moved from Seattle to Spokane, Washington.

Quarantine extended to include the entire State of Washington and all of Canada.

Cultivated black currant eradication started in Idaho, Montana, and Washington.

Control reconnaissance (Pine and ribes survey) begun on the National Forests.

Agass eradication with 5-man crews started on Priest River Experimental Forest.

Money appropriated \$5,000 for control work.

1924

Two 25-man control camps established in Upper Priest River Valley.

Control reconnaissance extended to state and privately-owned land and financed by funds from States and Timber Protective Association.

Quarantine inspectors stationed in five northwestern cities.

1925

Devastating forest fires created a severe future control problem on thousands of acres. On the Hanford National Forest, Idaho, all men from three blower post camps fought fire for one-half of the field season.

1926

Cooperative ribes eradication work started in Idaho with contributions from the States of Idaho and Priest Lake Timber Protective Association.

Control work begun at Savanah Nursery, Montana.

Subsisted black currant eradication program continued in Inland Empire.

1927

Cooperative ribes eradication work started by the Clearwater and Potlatch

1929 Cont'd

Timber Protective Associations in Idaho. All work in Clearwater and Potlatch areas directed against Ribes petiolare stream type as a delaying measure in rust intensification.

1930

Forest Service started ribes eradication on Clearwater National Forest, Idaho, with an appropriation of \$25,000. Supervision of 100-man project (four camps) furnished by the Bureau.

Control work begun in the Longmire area of Mt. Rainier National Park.

1931

First large-scale operations - Clearwater National Forest, Idaho, 20 camps and 600 men. Work on Forest Service lands expanded to include ribes eradication in upland areas as well as stream types.

Cooperative ribes eradication included State of Idaho; Priest Lake, Clearwater, and Potlatch Timber Protective Associations; Milwaukee Land Co.; and Rutledge Timber Company.

1932

Depression caused almost complete withdrawal of financial contributions from state and private sources.

Ribes eradication practice on all operations changed to include upland as well as stream type areas. Intensification of the disease and uncertainty of future funds necessitated a change from delaying measures to complete ribes removal.

Forest Service program expanded to include 20 camps on the Clearwater National Forest and 13 camps in the St. Joe National Forest, Idaho.

1933

With the advent of federal unemployment relief programs, the region hit big-time operations with thirty-five 200-man CCC camps and twelve 50-man camps.

1934

State of Idaho resumed financial contributions with a \$30,000 appropriation.

Ribes eradication started on Cabinet National Forest, Montana.

First complete blister rust control program prepared for the region.

Peak year in control operations with 160 camps, 11,100 workers, and 270,257 acres covered.



1935

Marked decline in size of program due to loss of NIRA funds and reduction in the number of CCC camps. WPA funds and crews became available late in the season.

Experimental control work started in Colorado and Wyoming.

Ribes eradication started on Mount Spokane, Washington, and Kootenai National Forest, Montana.

1936

WPA program expanded to 139 camps and 5,428 men. Sixty trucks used to transport 1,360 men from south Idaho. Some hauls as long as 800 miles. Special trains used to bring 577 men from Puget Sound area.

Worked area classifications developed and used for the first time: Maintenance, Post Check, Rework. Advance Check and Regular Check also added to checking procedure.

Snag-falling and broadcast burning to clean up bad fire hazard and ribes areas, started with CCC and WPA labor.

Regional Leader (Wyckoff) transferred to the Forest Service.

Portable, collapsible wooden mess halls and furniture designed and built. Many original units still in use after 17 years of service.

1937

Post-check activities expanded to determine status of large acreages worked during 1933 and 1934.

Six Bureau supervisors transferred to the Forest Service.

The Western Region was divided into the Northwestern Region and the Pacific Coast Region.

1938

First canker elimination by pruning performed to save infected young white pines. Ribes eradication work discontinued in Wyoming.

1939

Ribes eradication started on Glacier National Park, Montana. Control work discontinued in Colorado.

1940

Pruning to eliminate cankers started on large scale to save badly infected stands.

Attention given to blister rust in management of western white pine.



1941

Last season for CCC and WPA crews.

Last year of work on Mount Spokane operation.

Passage of Lea Act providing for work on state and private lands on dollar-for-dollar basis prompted the resumption of financial participation in blister rust control by the Clearwater, Potlatch, and Priest Lake Timber Protective Associations. Funds were raised by an annual 2¢ per acre assessment over the entire acreage of the associations, netting approximately \$16,000 per year.

Attempt to control blister rust in Grand Teton National Park disapproved.

1942

World War II and its accompanying economic disarrangements resulted in control accomplishments far below needs. Heavy losses were to be experienced in many white pine stands through failure to establish protection. Labor shortages, high wages, material costs, and forest fires were the chief handicaps. High school boys, Mexican Nationals, conscientious objectors, and German and Italian internees were the principal sources of labor. Fire duty proved very disruptive to the blister rust control project, in some seasons adding 30 percent to effective man-day costs. With the end of the CCC program, BRC crews became the first line of defense for fire control.

1943

Reclassification of blister rust control areas started; (A) working unit as a subdivision to be considered in its entirety for planning control work; (B) area classes established based on pine producing value, status of disease, and protection difficulties involved.

1944

First important steps taken by U. S. Forest Service to employ silvicultural methods of rust control; (A) fire and (B) partial cutting. Factors controlling ribes seed germination, seed devitalization, and ribes seedling suppression had been demonstrated in study plots.

Record keeping changed to show (A) net accomplishments by types and (B) year of origin of timber stands.

1945

Ribes eradication started on Yellowstone National Park.

1946

Adoption of the 40-hour week constituted a severe handicap to control work. Effective man-day costs three-times that of prewar level.

1947

Contracting of ribes eradication inaugurated.

1947 Cont'd

Marking instructions for cutting timber on National Forest lands in U. S. Forest Service Region One include provisions for reducing ribes problems.

1948

Report issued on "Development of a blister rust control policy for the National Forests in the Inland Empire" -(240.)

The adoption of the 48-hour week proved highly advantageous to the project.

Idaho State biennial appropriation increased from \$30,000 to \$40,000.

1949

Forest Service committed to the policy of managing stands to grow all white pine possible in units protected from blister rust.

Analysis of all pine units in region begun to determine priorities.

1950

Idaho State biennial appropriation increased from \$40,000 to \$50,000. Private agencies give better attention to coordination of management and protection measures related to the growing of white pine.

1951

Regionalization of Bureau of Entomology and Plant Quarantine. Administrative functions moved to Berkeley, California. Northwest Region became Northwestern Project.

Major findings resulting from unit analyses outlined a tentative 5-year BRC program set up for the Forest Service.

Private operators in Idaho express a high degree of responsibility in forest management by favoring use of 10 percent of slash fund as an operator's fund to combat insects and diseases.

1952

Idaho State biennial appropriation increased from \$50,000 to \$60,000.

The Clearwater and Potlatch and Priest Lake Timber Protective Associations increased assessment for blister rust control from 2 cents to 3 cents per acre starting with fiscal year 1953. The total amount of these annual contributions from the Associations is about \$25,000.



PACIFIC COAST REGION

1923

Cultivated black currant eradication started in Oregon.

Black currant quarantine law enacted in Oregon.

1924

Cooperative agreements signed between Bureau of Plant Industry and Oregon State Board of Horticulture, State Board of Forestry and State Agricultural College; and California State Department of Agriculture and State Board of Forestry.

Black currant eradication started in California. Headquarters established at Sacramento, California.

1925

Black currant eradication program completed in Oregon.

1926

Federal Plant Quarantine No. 63 and Oregon State Quarantine No. 18 promulgated to restrict movement of host plants.

1927

Black currant quarantine law enacted in California.

University of California added as a cooperating agency.

1930

Black currant eradication program completed in California.

1933

Program changed from experimental to practical control.

Start of control work under the unemployment relief programs with CCC and NRA labor.

California headquarters moved to Oakland from Sacramento.

1934

NIRA camps operated with PWA funds.

1935

Work started on ERA funds with WPA camps.

Technical staff increased.

Oakland office designated as regional headquarters for Pacific Coast Region.



1936

Program in the Western United States divided into two regions - North-western and Pacific Coast.

WPA regulations restricted employment to the use of 90% relief labor in blister rust control camps.

1937

ERA restrictions tightened: 95% relief labor and 120 hours a month. Smallest number of camps any year since 1932.

1938

Two camps operated on regular Bureau funds in addition to CCC and WPA camps. No lessening of ERA restrictions.

1939

Entire Bureau operation in California shifted to Sierra National Forest. Highest expenditures, more camps and more workers than any year.

1940

Mt. Hood unit abandoned.

1941

Program curtailed due to closing of Bureau ERA projects and end of CCC aid.

State of California appropriated \$50,000 for the program for the fiscal years 1942 and 1943.

State of Oregon passed enabling act aiding the program.

1942

Holding program adopted for duration of the war, due to war-time restrictions and regulations on mileage and food rationing.

Three California lumber companies became participating cooperators.

1943

War-time restrictions on rationing with labor ceiling. Increase in wages by over-time pay for common labor. High school boys the chief source of labor.

State of California appropriated \$100,000 for control work for fiscal years 1944 and 1945.

1944

Work curtailed by war restrictions, high wages and short season.

1945

War-time limitations continued. Delinquent youth and Mexican Nationals used for the first time to supplement labor. Fire-fighting interrupted regular work as much as 50 percent for some camps.

California increased the State appropriation to \$150,000 for fiscal years 1946 and 1947.

1946

Resumption of 18 year minimum age for employees.

Post-war labor supply becomes nearly normal.

1947

The State of California assumed a key role in contributing financially to the control problem on state and privately-owned lands with an appropriation of \$125,000.

1949

Use of contract procedure and the one-man system further extended.

Adoption of the concept of local control leads to reappraisal of pine areas based on new economic formulas worked out by Dr. Henry J. Vaux, University of California School of Forestry.

One-half the ribes eradication work contracted to private parties at a saving of 25 percent in cost over hired labor.

Reorientation of control work continued, based on concept of local control and the application of economic criteria to the selection of sugar pine stands.

Bureau collaborated actively in the economic study of sugar pine management.

California continued its key role in the control program through the contribution of \$168,437. Private agencies contributed \$2,000.

1951

The Bureau regionalized its activities under a single administrative head in the western states as Region IV with headquarters in Berkeley, California.

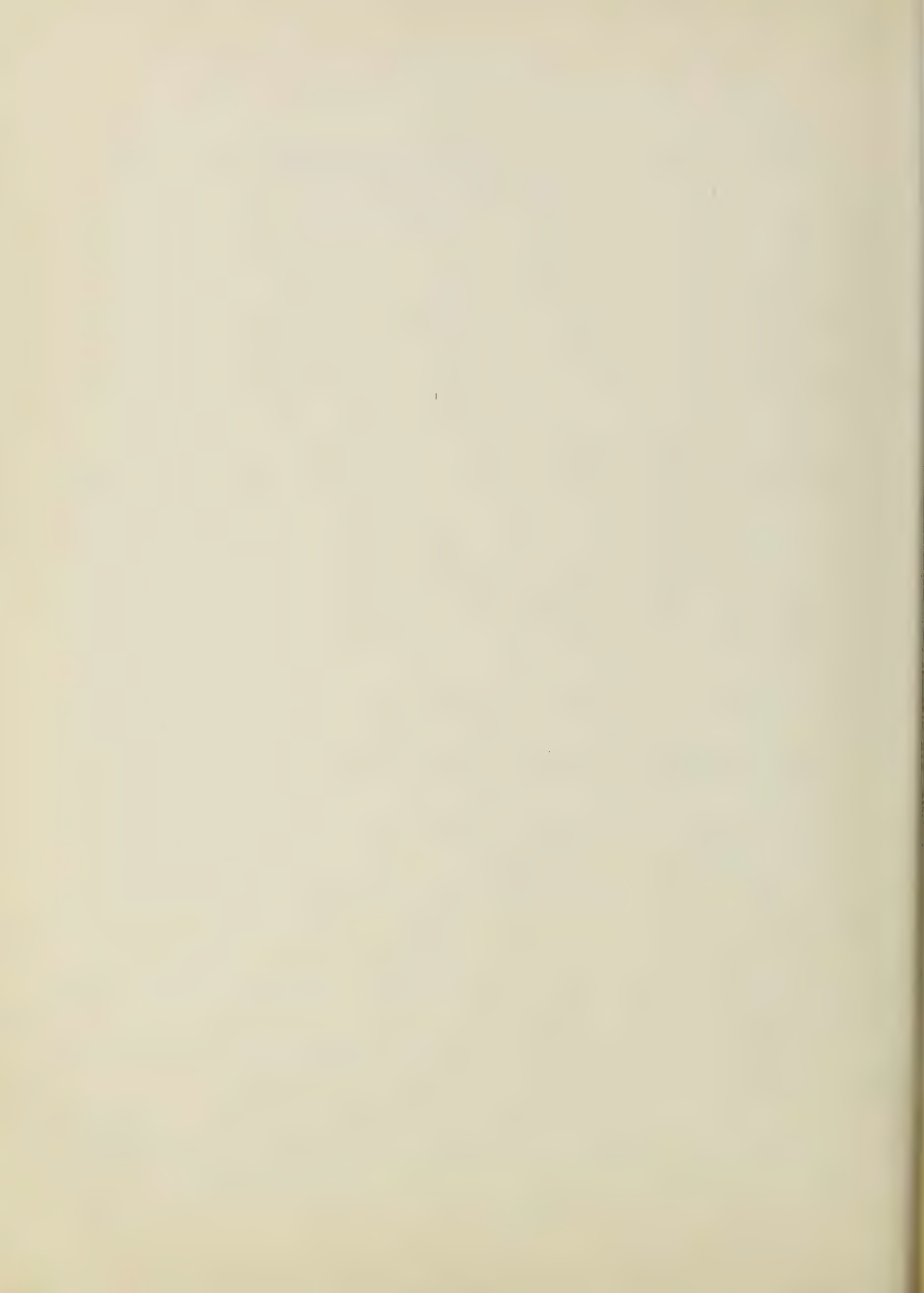
The Blister Rust Control Project was modified and continued to share office space with the regional staff.

1952

The BRS Project moved to new quarters in Oakland, California along with the Regional Office.

INVESTIGATIONS - RESEARCH ON THE FUNGUS





INVESTIGATIONS-RESEARCH ON THE FUNGUS  
NORTHEASTERN REGION

Note: Bracketed numeral refers to the Bibliographical Section.

1909-1916

Preliminary research was in progress, first involving an exhaustive review of European literature, then laboratory exploration into the life history of the causal fungus and finally, the beginning of large scale investigations under field conditions.

1917

Studies at Kittery Point, Maine indicated the possibility of over-wintering of the fungus on ribes through uredo pustules on stems. Aecial development also noted on pine slash the spring following logging.

1918

Investigations carried on at Block Island, Rhode Island; Kittery Point, Maine; North Conway, New Hampshire (York); Lewis, New York (Pennington); to study longevity and distance of the spread of spores. Results indicated relatively short-lived character of sporidia, also effect on limitation of spread by such factors as the composition, height and density of vegetation between ribes and pine. Over-wintering on dead ribes leaves also demonstrated.

Studies initiated involving the inoculation of white pine with sporidia of the blister rust fungus. Report published in 1927 - (102).

1919

Investigations continued by Drs. York and Pennington with special emphasis on the determination of distance of distribution of the different forms of spores of the causal fungus. Conclusion reached that width of ribes-free zone should be, under average conditions, 200-300 yards.

Emphasis given to the danger of spread from European black currants as result of Richards' study at Temple, New Hampshire showing spread of over a mile from Ribes nigrum.

1920

Blister rust situation in several European countries studied; report published in 1924 - (85).

1922

Study initiated in New York to determine rust-spreading potential of cultivated red currants; report published in 1941 - (211, 212, 213).

1923

Research on the longevity of teliospores and accompanying uredospores; report published in 1925 - (92).

1923 Cont'd

Investigation of the influence of physical factors on the viability of sporidia; report published in 1926 - (99).

1925

Report on conditions antecedent to infection - (91).

1927

Research initiated on the production and germination of sporidia; report published in 1935 - (159).

1928

Research initiated on canker development on young pines; report published in 1939 - (197).

1929

Report on comparison of European with North American conditions - (117).

1935

Report on the production and germination of sporidia - (159).

1936

Report on the progress of infection in planted white pine - (169).

1938

Report on the relation of stomata to infection - (183).

1940

Report on the relative susceptibility of five-needled pines in the East to blister rust attack - (203).

1942

Report on the relation of certain meteorological factors to infection - (215).

1944

Report on the distribution of blister rust cankers according to needle-bearing wood at the time of infection - (227).



NORTH CENTRAL REGION

1933

Report on "Field Inoculations of Pinus strobus with sporidia of Cronartium ribicola in Minnesota"- (145).

1943

Report of "Study of blister rust infection on Pinus peuce, P. koraiensis, P. strobus, and P. monticola at the Cloquet Forest Exp. Sta. Minnesota" - (221).

NORTHWESTERN REGION

1926

Report of "Studies of white pine blister rust in the West" - (96).

1928

Report on "The inoculation of Pacific Northwest Ribes with Cronartium ribicola and C. occidentale" - (106).

1932

"Preliminary report on the relative susceptibility of sugar pine and western white pine to blister rust" - (137).

1933

Report on "Mode of entrance and periods in the life cycle of Cronartium ribicola on Pinus monticola" - (142).

Report on "Resistance of the current season's shoots of Pinus monticola to infection by Cronartium ribicola" - (143).

Report on "Method of determining the age of blister rust infections on western white pine" - (144).

Report on "Tuberculina maxima in western North America" - (146).

Report on "Comparison of Pycnial stage of Cronartium ribicola on Pinus lambertiana and P. monticola" - (147).

1934

Report on "Seasonal development of Ribes in relation to the spread of Cronartium ribicola in Pacific Northwest" - (152).

Report on "Growth and injurious effects of Cronartium ribicola cankers on P. monticola" - (153).

Report on "Survival of blister rust mycelium in western white pine" - (154).

Report on "Damage to Pinus monticola by Cronartium ribicola at Garibaldi, B. C." - (155).

1935

Report on "Dates of production of the different spore stages of Cronartium ribicola in the Pacific Northwest" - (165).

1938

Report on "Annual growth rate of Cronartium ribicola cankers on branches of Pinus monticola in Northern Idaho" - (178).

1938 Cont'd

Report on "Blister rust damage to merchantable western white pine " - (179).

Report of "Initial tests of the distance of spread to and intensity of infection on Pinus monticola by Cronartium ribicola from Ribes lacustre and R. viscosissimum" - (180).

Report on "Susceptibility of ribes to Cronartium ribicola" - (185).

Report on "Susceptibility of needles of different ages on Pinus monticola seedlings to Cronartium ribicola infection" - (188).

1940

Report on "Needle-bearing internodes on western white pine reproduction in relation to blister rust infection" - (200).

Report on "Mycelial extent beyond blister rust cankers on Pinus monticola" - (202).

Report on "Time growth of Cronartium ribicola cankers on Pinus monticola at Rhododendron, Oregon" - (204).

1942

Report on "Secondary fungi associated with white pine blister rust cankers" - (214).

1943

Report on "Susceptibility of white bark pine to blister rust in the Pacific Northwest" - (219).



PACIFIC COAST REGION

1921

Report of "Investigations to Determine the Identity of a Cronartium on Ribes in California" - (68).

1929

Laboratory investigations instituted at Berkeley, California.

1933

Report on "Susceptibility to Blister Rust of the Two Principal Ribes Associates of Sugar Pine" - (148).

1935

Report on "Susceptibility of Principal Ribes of Southern Oregon to White Pine Blister Rust" - (162).

Report on "Chemical Control of Harmful Fungi During Stratification and Germination of Seeds of R. roezli" - (170).

1944

Report on "Susceptibility to White Pine Blister Rust of Ribes cereum and Some Other Ribes Associated With Sugar Pine in California" - (228).

1949

Report on "Effective Control of Ribes With 2,4-D and 2,4,5-T" - (245).

1951

Report on the use of chemicals in control work: "Fogging Ribes, White Pine, and Brush with 2,4-D by Helicopter" - (253).

INVESTIGATIONS - FIELD STUDIES AND SURVEYS





INVESTIGATIONS-FIELD STUDIES AND SURVEYS

NORTHEASTERN REGION

1916

Experimental canker removal work initiated by Martin at Ipswich and Lenox, Massachusetts.

1917

Census of cultivated ribes made in Massachusetts and infected European black currants destroyed.

1918

Canker removal work performed in Newburyport, Massachusetts.

First experimental work in the chemical eradication of ribes undertaken by Regan in Barre and Petersham, Massachusetts.

1919

Infection study made on a 41-acre pine lot (Elliot) at Littleton, New Hampshire. Of the 3,014 pines (avg. 6.2" dbh) 55.4 percent were infected.

Study made by Detwiler of spread of infection from Ribes nigrum to adjacent white pine plantation at Wilton, N. H.

1920

On strip lines radiating from the Elliot Lot at Littleton, New Hampshire, including adjacent plots, comprising a total area of 185 acres, 26.5 percent of the pines were infected. On the strip lines alone, totalling 67.5 miles, 10 percent of the pines were infected.

Studies made by Young on the relation of blister rust damage to forest management.

Studies initiated on the ecology of ribes and its application to the control of the disease; report published in 1922 - (72).

Studies started by Darrow to find substitutes for cultivated ribes, especially red currants for jelly-making.

Successful demonstration in Massachusetts by Regan of the eradication of ribes with fuel oil and dip oil.

Study by Endersbee on spread of infection to pine from a single Ribes cynosbati (200'LS) at Cabot, Vermont showed 65 percent of the infected pines were within radius of 200' of bush. Maximum spread 500 feet.

1921

Investigations of infection conditions at Hittary Point, Maine, demonstrated

1921 Cont'd

heavy damage, relatively short distance of spread and the effectiveness of the eradication of ribes in the control of the disease; report published in 1924 - (86).

Damage studies at Littleton, New Hampshire and Brunswick, Maine.

Experiment conducted in selective eradication at North Hudson, New York.

Practicability of tree surgery in the removal of cankers to save ornamental pines, demonstrated in report of canker removal experiments (69).

Development and distribution for trial of the high-bush cranberry (Viburnum americanum) as a substitute for red currants.

Study by Endersbee at Alfred, Maine showed no pine infection originating after skunk currants eradicated in 1917, but in comparable unprotected area at Springvale, Maine over 50 percent of the pines were infected during previous 7 years.

1922

Study by Fivaz in Warren County, N. Y. revealed that 20 percent of the pines were infected on a road wide strip, 12 miles long.

1923

Completed pine survey for eastern Connecticut and Rhode Island showed 98 percent of the area naturally protected, due to the scarcity of ribes.

Study of the ecology of ribes started by York and Snell in New York.

1924

Study initiated on damage to uneven aged pines in pasture type at Waterford, Vermont, and the following year in an adjacent 60 year old pine stand. The latter showed 76 percent of the pines infected and 65 percent had fatal stem cankers. Report published in 1933 - (140).

A study of infection by Reop in a plantation (Crane Plot) in Ipswich, Massachusetts, showed that 75 percent of the pines were infected.

Cartographical survey of white pine started in the Northeastern States.

1927

Studies initiated to determine longevity and germination of seeds of ribes, particularly R. rotundifolium. Report published in 1931 - (132), showed that seeds remain viable in the duff for years, and that disturbance of the duff by animals, logging, fire, and uprooting of trees by wind favor the germination of such dormant seeds.

White pine forest survey (cartographical) in the Northeastern States completed. Results showed a pine area of 8,221,167 acres.



1927 Cont'd

Report by Richards on the susceptibility of different aged pine needles to blister rust and relation between the number of infections on pines and the persistence of their needles. Blister Rust News: 11:241-247.

1930

Report by Littlefield on experiments made with regard to sprouting in two species of wild ribes (R. rotundifolium and R. cynosbati). Blister Rust News 14 (3) 90A-104.

1932

Field tests started on the susceptibility of the Viking currant; report published in 1936 - (168).

1934

Plot and strip line studies made to determine infection conditions in protected and unprotected areas. In protected areas on 72.6 acres in 26 towns in New Hampshire, New York, Vermont and Pennsylvania, 22.4 percent of the 19,535 pines were infected. Only 2.2 percent of the blister rust cankers originated after initial control work had been performed. In additional studies on 13 miles of rod-wide strip lines in New Hampshire and New York, 35 percent of the 15,808 pines were infected. Only 1.8 percent of those pines became infected subsequent to control work. In unprotected areas on 31.2 acres in 33 towns, 49.9 percent of the 17,569 pines were infected. Most of the cankers were of recent origin, 39.8 percent of them having originated during 1930 and 1931, indicating the danger of delaying protective work.

1935

Dr. P. L. Rusden designated in charge of Field Investigations in the Northeastern States.

1937

Effectiveness of control plot studies made in Maine, New Hampshire, Vermont, Rhode Island and New York on sites containing pines chiefly under 20 feet in height. In protected areas on an aggregate of 87.5 acres, 17.5 percent of the 66,351 pines were infected with 15,548 cankers but only 10 percent of these originated after protective work. In plots on unprotected areas comprising  $68\frac{1}{4}$  acres, 23.7 percent of the 52,635 pines were infected. Fifty-seven percent of the cankers on the unprotected areas had developed within the seven previous years.

1940-1945

Blister rust damage studies made in areas of merchantable-size pine in Maine, New Hampshire, Vermont and New York. In the 117.5 acres in the studies, 45.4 percent of all the pines were dead or would die as a result of stem cankers. These diseased trees contained 46.1 percent of the total volume. In addition, about 10 percent of the total number of pines were infected only with branch cankers which might eventually kill the trees.



1947

Infection plot-survey started to procure data throughout the Northeastern States from small (one-tenth acre) random samples in pine reproduction (1-10 ft. height class).

1949

Survey conducted by the State Department of Agriculture in New Jersey to determine infection and ribes conditions in eight selected townships.

1950

First progress report (Rusden) on infection plot study showed 4.5 percent infection.

Survey made to determine acreage, volume and value of the white pine in the Northeastern States in the region, placed the estimated current and potential maturity value at \$154 million.

1952

Report issued (Rusden and Perry) on ribes regeneration on 1938 hurricane-disturbed areas, stressed the importance of the removal of established bushes before disturbances occur, and the important role of skunk currants in the build-up of live-stem.

Second and final report on damage to mature pines at Waterford, Vermont, showed that 73 percent of the crop trees had been killed. The dead trees alone, plus loss in increment, represented 49 percent of the stand volume. An additional 25 percent of the volume was in living pines with stem cankers (255).

Second progress report (Perry) on infection plot study showed substantially the same degree of infection (4.4 percent) as in the first report.

SOUTHERN APPALACHIAN REGION

1917

Scouting for infection in Georgia, Maryland, North Carolina, South Carolina, Virginia and West Virginia. No rust found.

1918

Scouting for infection in Delaware, Maryland, North Carolina, Virginia and West Virginia. No rust found.

1919

Scouting for infection and general white pine reconnaissance in Kentucky and Tennessee. No rust found.

1928

General reconnaissance on the George Washington National Forest in Virginia and on the Forest Service Nursery at Parsons, West Virginia.

1930

Pine distribution survey made throughout the South by Cope.

1932

General ribes reconnaissance in Maryland, North Carolina, Virginia and West Virginia.

1936

Tennessee system of survey initiated.

Ribes regeneration study plots established in Maryland, Virginia and West Virginia.

1938

Grid system type of survey started in Georgia and North Carolina.

Survey made of Washington, D. C. for white pine and ribes.

1940

Grid system started in Virginia and West Virginia.

Uniform system of establishing ribes regeneration study plots inaugurated.

Report by Yost on spread of infection in unprotected white pine areas in Garrett County, Maryland.

Report by Yost on the susceptibility of southern gooseberry (R. *corvatum*) to blister rust.

1942

Report by Yost on the comparison of blister rust infection on pine in seven protected and ten unprotected areas in Garrett County, Maryland.

1943

Report by Welch on the infecting power of cultivated ribes as observed in Pocahontas County, West Virginia.

1944

Report by Welch on infection and damage from blister rust caused by one Ribes bush in Pocahontas County, West Virginia.

1945

Resurvey of white pine lands in Kentucky and South Carolina started.

1946

Completed all white pine surveys in Georgia.

Initial study made on Ashe County, North Carolina white pine infection area.

Report by Yost on observations of blister rust infection on white pine from fixed amounts of Ribes live stem.

Report by Hepting and Yost on the development of white pine blister rust in an unprotected area in North Carolina.

1947

Report by Welch on further observations of the spread of blister rust from one Ribes bush to white pine in Pocahontas County, West Virginia.

Three test plots for the use of 2,4-D on decapitated Ribes rotundifolium and R. cynosbati established. Both species appeared resistant to the chemical. Study initiated on large maintenance area to determine the best type of organization and long-range program.

Tests with 2,4-D and Geon X-31 showed moderately effective results on R. cynosbati but high resistance shown by R. rotundifolium.

Disease survey in the region started. First survey run in West Virginia showed 40 percent infection on unprotected areas and less than 5 percent on protected.

1948

Report by Yost on the time required for blister rust to kill white pine trees of different sizes.

Arrangements made to test "immune" Canadian black currants for resistance to rust.



1948 Cont'd

All white pine surveys completed in southwestern Virginia, Kentucky and South Carolina. Latter two states placed on permanent maintenance.

Surveys and post-checks in eastern Tennessee revealed numerous large Ribes missouriensis bushes. Some contained over 1500 feet of live stem.

Further tests made on the effectiveness of 2,4-D spray on R. cynosbati and R. rotundifolium.

1949

Twenty-two resistant white pine grafts obtained from Dr. A. J. Riker, University of Wisconsin, were planted for observation.

Seventeen Canadian black currants were planted in a location near heavily infected native ribes. No infection noted.

Observations on 1948 applications of 2,4-D indicated limited effectiveness on Ribes rotundifolium, R. cynosbati and R. missouriensis.

Tests of the use of one-man system for the eradication of ribes indicates practically no advantage over other methods in this region.

1950

Thirty-four resistant white pine grafts received from Dr. Riker, planted in areas of heavy infection in Pocahontas and Tucker Counties, West Virginia.

Tests conducted to determine the effectiveness of a combination of 2,4-D, 2,4,5-T in oil as basal and foliage sprays.

Survey made to determine acreage, volume, and value of white pine in the Southern Appalachian States. Estimated current and potential value was 179 million dollars.

Conference and field study with Forest Service officials regarding standards for areas protected. New minimum standards established.

NORTH CENTRAL REGION

1922

Experimental pine and ribes plots for developing control measures established at Eau Galle, Wisconsin by Ninman.

1927

In 21 permanent plots in Minnesota, 9.3 percent of the pines were found infected. Studies also in Minnesota indicated that rework is necessary about five years after initial work and that control work in 1919 was effective.

Cartographical survey (Hirt) showed 700,000 acres of white pine in Minnesota.

1928

Survey by school pupils in Michigan revealed infection on ribes in 14 counties.

1932

Chemical ribes eradication experiments started in Wisconsin with sodium chlorate and similar chemicals. Results showed method too expensive to be practical.

1933

Surveys to obtain a better picture of the control program emphasized during the winter months.

1935

Dr. E. E. Honey assigned to investigative work; pine infection and ribes regeneration plots established throughout the region.

1936

Value of the white pine in the region estimated at \$63 million.

1938

Pre-eradication surveys nearly completed except in Northeastern Minnesota.

1939

Post-check survey started on areas worked four or more years ago.

1940

Value of the white pine in the region estimated at nearly \$104 million.

1941

A study of 24 protected pine plots by Dr. Honey showed only insignificant pine infection originating 3 to 9 years after working.



Study of ribes found on initial and second workings showed only one quarter the number of bushes on second working. (Technical Memorandum No. 1, Putnam).

Ribes prinos found much more susceptible than R. strabus at Cloquet Experiment Station, Minnesota. (Technical Memorandum No. 2, Honey, Nelson, Putnam).

#### 1944

Report of study of regeneration of Ribes cynosbati from seed after ribes eradication. Great increase of seedlings on burned area. (Technical Memorandum No. 3, Putnam).

Rust development particularly rapid, damage severe in northeastern Minnesota. (Technical Memorandum No. 4, Putnam).

White pine timber production in Lake States 70 percent of national production in period 1864 to 1942. Peak in Michigan: 1879 to 1889; in Wisconsin: 1880-1899; in Minnesota: 1899. (Technical Memorandum No. 5, Putnam).

#### 1945

Report on white pine in Wisconsin in 1897 as compared with that in 1944. (Technical Memorandum No. 6, Putnam).

#### 1946

Ribes regenerate very slowly 6 years after eradication in a young, ungrazed hardwood type, Wisconsin. (Technical Memorandum No. 7, Putnam).

#### 1947

Ribes eradication economically justified even in a heavily infected stand, if pines continue to come up from seed. (Technical Memorandum No. 8, Honey, Putnam).

Estimated value of white pine in the region placed at \$120 million.

#### 1948

Steps of Progress in control program, 1910 to 1948, outlined. (Technical Memorandum No. 9, Kresber).

Blister Rust Control costs to put Wisconsin white pine on maintenance basis, averaging \$1.50 per thousand board feet, economically justified. (Technical Memorandum No. 10, Putnam).

#### 1950

Present and potential white pine timber values, North Central Region placed at \$587,000,000 total; \$453,400,000 in control areas. (Technical Memorandum No. 11, Putnam).

#### 1952

Dr. Melander assisted in outlining chemical treatments to kill ribes.

Mr. Bergeson started program of spraying upright-growing ribes each month of the year with various formulations of 2,4,5-T in oil in Illinois.



NORTHWESTERN REGION

1923

Ribes-to-pine spread plot established at Cheezyke, B. C. (Long distance spread was noted on this plot.)

Ecology studies and experiments in chemical eradication started.

Control reconnaissance (pine and ribes survey) started on the National Forests.

1924

Reconnaissance extended to state and privately-owned lands.

1925

Ribes eradication methods project started.

1926

Ribes ecology plots established to study germination and growth.

1927

Experimental ribes eradication moved from Kaniksu to Coeur d'Alene National Forest, Idaho. Five-camp project.

1928

Ecology studies showed ribes seed longevity and ribes seedling survival.

Pre-eradication survey started on Mount Rainier.

1929

Effectiveness of control studies initiated. Several types of chemical sprays given large-scale field trials to determine effectiveness.

1930

Duff mantle studies made in connection with ribes seed storage and survival.

1931

Report of "Experimental Ribes Eradication, Stanislaus National Forest, California," (130).

Report of "Chemical Eradication of Ribes," (133).

Report on "Spread and Development of White Pine Blister Rust in the Inland Empire," (134).

1932

Oblique aerial photographs of control areas secured to aid in surveys.

-76-

1934

Surveys started in Colorado and Wyoming.

1935

Large-scale disease survey project organized and carried out during fall. Results showed an average of 4.3 percent of white pine trees infected with blister rust.

1937

Plots established to test ribes live-stem standards.

1938

Effect of silvicultural practices on ribes demonstrated.

Report on "Probable Damage by Blister Rust in Some Representative Stands of Young Western White Pine," (181).

1939

Study inaugurated to test reliability of checking results.

1940

Checker-flanker method tried experimentally and became an important method in checking probable maintenance areas.

Plots set up to study the effect of variable light, temperature and moisture conditions on the germination, growth, and development of ribes and pine.

Report on "Blister Rust Control in the Management of Western White Pine" - (201).

Report on "Chemical and Mechanical Methods of Ribes Eradication in White Pine Area of the Western States" - (206).

1943

Plot studies show that a very few ribes can cause considerable infection.

1944

Report on "Self-incompatibility in several species of ribes in western states" - (231).

1945

Power spraying tests on cutover lands showed substantial labor savings possible. Use of 2,4-D tested.

Report on "The Seasonal Development and the Fertilizing Effect of Green Manure in a Naturally Infected Ribes Forest" - (237).

1946

1947

1948

1549

1930

1951



PACIFIC COAST REGION

1925

Reconnaissance on federal and privately-owned lands in Oregon.

Experimental ribes eradication started on Rogue River National Forest in Oregon.

1926

Control reconnaissance started in California.

Experimental ribes eradication commenced on Stanislaus National Forest in California.

1928

Pre-eradication survey started on Plumas National Forest, California.

1929

Pre-eradication survey continued on Plumas National Forest in California.

Experimental ribes eradication on Plumas National Forest.

1930

Control reconnaissance on Eldorado National Forest, California.

Experimental ribes eradication on Mt. Hood, Oregon and Stanislaus National Forest in California.

1931

Extensive reconnaissance in southern Oregon.

Intensive reconnaissance on Klamath National Forest, California.

Experimental ribes eradication on Stanislaus National Forest, California.

1932

Sugar pine survey started in California.

Intensive reconnaissance on Stanislaus and Eldorado National Forests, California.

Experimental ribes eradication work concluded on Stanislaus National Forest.

1934

Large reconnaissance program started with first intensive reconnaissance in Oregon.

1938

Report on "Spread of Blister Rust to Sugar Pine in Oregon and California" - (186).

1946

Experimental use of contract labor in ribes eradication work.

Testing of chemical 2,4-D on a large scale field basis.

1947

Work started on the economic and pine management studies by the California Forest and Range Experiment Station in collaboration with Region 5 of the U. S. Forest Service, Bureau of Entomology and Plant Quarantine, the lumber industry, and the California State Division of Forestry.

Experimental trials of the one-man system of ribes eradication begun.

1948

Experimental spraying from the air using a helicopter.

Report on "Some Economic Aspects of Growing Sugar Pine in California" published - (241).

1949

Field surveys made on 64,800 acres based on studies on the appraisal of out-over sugar pine lands.

1950

Pine appraisal surveys using the principle of the application of economic criteria were conducted on 146,744 acres.

1951

Testing of the Henry J. Vaux economic formula for evaluating and rating pine stands for selection and inclusion within control units indicate satisfactory results.

Pine appraisal surveys based on the Henry J. Vaux economic formula conducted on 76,200 acres.

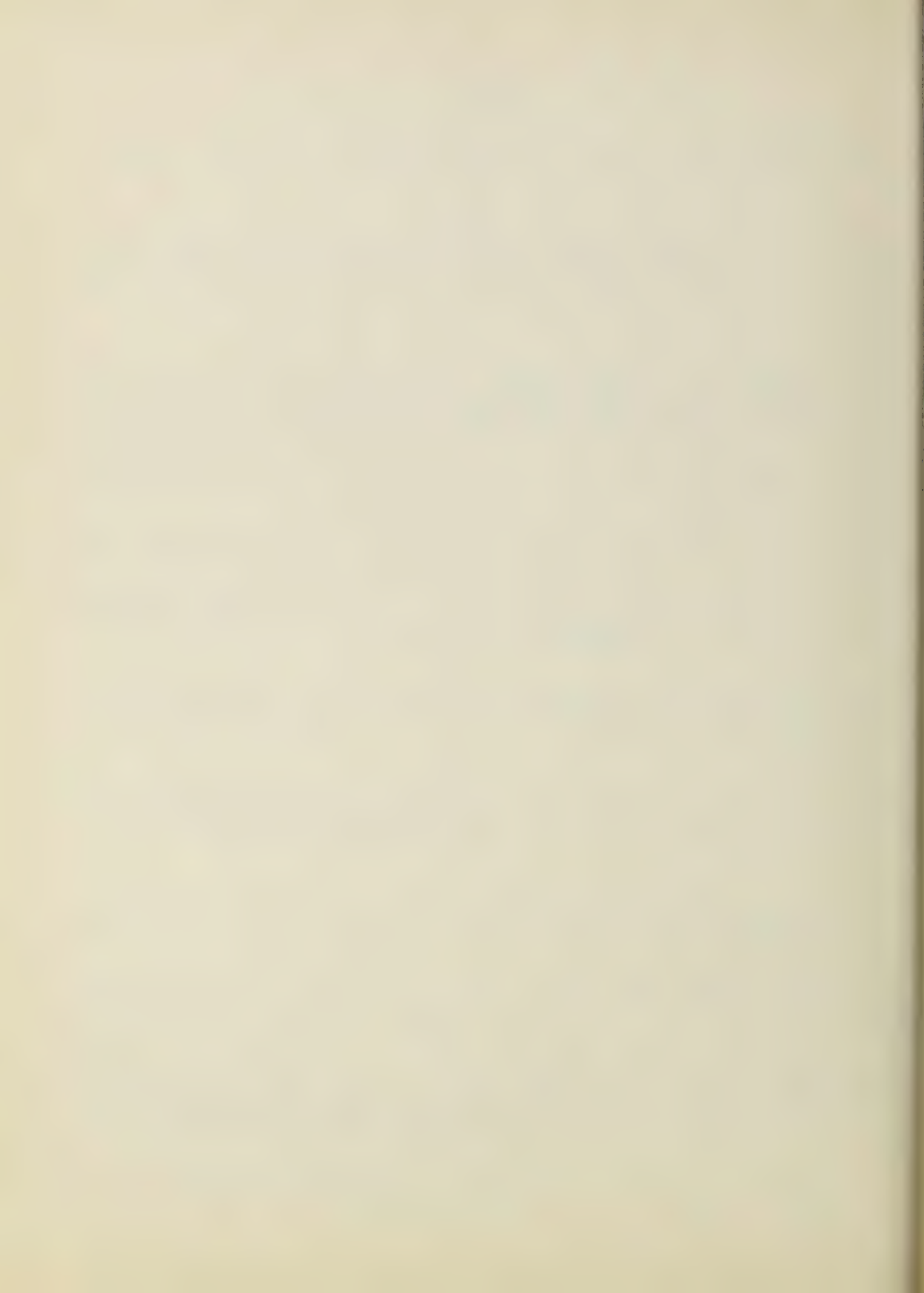
1952

Results of 25 years study by C. R. Quick on "Ecology and Control of the Sierra Gooseberry", forming the basis of present standards of control, compiled as Bureau Ms. No. 9819.

Pine appraisal surveys were made on 119,015 acres.

INFORMATIONAL AND TRAINING





# GENERAL SUMMARY OF INFORMATIONAL AND SERVICE ACTIVITIES\*

1922 - 1952

Region	Number Meetings Addressed	Attendance	Number Radio Talks	Number Items Published	Number Displays Placed	Number Initial Interviews	Number Follow-Up Calls	No. Persons Instructed In The Field
Northeastern	11,364	637,283	34	12,880	6,816	206,341	135,611	115,002
So. Appalachian	1,147	76,308	7	553	288	56,041	9,400	23,862
North Central	2,000	100,000	50	1,500	500	80,000	35,000	20,000
Northwestern	**	**	**	**	**	**	**	**
Pacific Coast	**	**	**	**	**	**	**	**
United States	14,511	813,591	91	14,933	7,604	342,382	180,011	158,864

\*Record incomplete due to lack of uniformity in record-keeping and variation in need for such work, dependent upon the type of pine ownership. Data for North Central region based on estimates.

\*\*No record available.

INFORMATIONAL AND TRAINING  
NORTHEASTERN REGION

1919

Manual of Control Procedures prepared (Filler) and issued to the field men.

1922

Training School for leadership personnel held at Littleton, New Hampshire and Warrensburg, New York.

1923

First radio talk on blister rust (Wheeler) from Station WBZ Springfield, Massachusetts on July 3.

Roadside demonstrations originated in New York.

Manual of Instructions prepared (Newman) for use in New Hampshire.

1924

Manual - "Facts that a blister rust inspector should know" prepared (Perry) for use in Massachusetts.

1925

First motion picture (silent) exclusively on blister rust prepared under the title "The Pines."

Instructional leaflet - "How to stop the spread of white pine blister rust", issued by The N. Y. Cons. Com.

1926

Portable 3-winged panel exhibit developed (Doore) in Massachusetts.

Instructional leaflet - "Rules and regulations governing white pine blister rust control work prepared (York) and issued by the N. Y. State Cons. Com.

"Foreman's Manual" prepared (Perry) for use in Massachusetts and later adapted for use as a regional manual.

1928

Permanent roadside display panels developed (Doore) in Massachusetts.

Descriptive guide to demonstration areas prepared in each state.

1938

Sets of window exhibit panels designed (Perry) and distributed to state and district leaders.



1938 Cont'd

Memorandum of instructions (Riley) issued to CCC and WPA supervisory personnel in Connecticut.

1940

Field work started on April 19 at Plymouth, Massachusetts on "shooting" scenes for new blister rust film in sound and color. Scenario by Martin and Perry. Film completed and released February 1942.

1945

Job Instruction Training (J.I.T.) courses given by Clave to leader personnel in the Northeastern States. "Job Break-Down" sheets prepared for teaching identification of ribes, eradicating ribes, working in crew formation, marking and following the line, and safety.

1946

Field work started August 19 at Littleton, New Hampshire on new series of six blister rust control films in sound and color. Scenarios by Newton and Perry. Films for the Northeastern Region released in 1948.

General Film : "Blister Rust - Enemy of the Pines"

Regional Film: "Our White Pine Heritage"

"Safety and Health Manual" prepared (Rusden) for use in all regions.

Conference on mapping held at Bridgton, Maine, for the purpose of developing standardized regional procedures for mapping on aerial photographs. Mapping manual developed and issued.

1950

Illustrated supplement to the Northeastern Field Manual entitled "So You Are Going to Work on Blister Rust" prepared (Miller) and issued as a regional training manual.

First television program involving blister rust, by District Leader Woolsehlaeger of New York.

SOUTHERN APPALACHIAN REGION

1939

Survey Manual prepared.

1940

Checking Manual prepared.

1941

Series of technical papers started by Pierce.

1946

Plans made for field work on new motion picture film.

Survey manual revised to include current procedures and survey by the grid system.

Training school held for field supervisors to secure application of uniform methods of establishing grid-control, mapping and checking.

New blister rust control manual prepared and issued to the field personnel.

1947

Memorandum on Duzmore white pine infection area issued (Welch).

Photography for new motion picture film completed.

Plans started to organize, develop and conduct more intensive informational work.

1948

Cooperators in Virginia provided with maps of ribes distribution to be used as planting guides.

New motion picture film (color and sound) released; titled "Return of the Pines"; scenario by Newton and Ball.

Marked increase in informational activities. During the year the motion pictures were shown to more than 10,000 persons.

1949

Cooperators in North Carolina provided with maps showing ribes distribution to be used as planting guides.

The motion pictures seem to be developing into a very effective media for pointing out the potential hazard of blister rust to white pine. Films viewed by more than 18,000 persons.

1949 Cont'd

A large sign prepared cooperatively by the West Virginia Conservation Commission, U. S. Forest Service and Bureau of Entomology and Plant Quarantine, was placed along the road at an infected area on the Monongahela National Forest to bring the severe damage by blister rust to the attention of passersby.

1950

A portable, mechanical blister rust exhibit designed by blister rust personnel was built by the U.S.D.A. Office of Exhibits for use in the Region.



NORTH CENTRAL REGION

1932

Two areas demonstrating rust on pines from black currants established in Upper Michigan; six demonstration areas in Minnesota.

Informational leaflet prepared for Junior Forest Rangers by Chambers and Koubes.

1933

Regional Blister Rust Control Manual prepared.

1934

Schools for instructing CCC workers held in Michigan, Wisconsin, Minnesota. 4,000 Wisconsin blotters showing life cycle distributed.

Motion picture prepared in Wisconsin to show ribes eradication and mapping methods.

1935

Training schools held for WPA, CCC, and other workers. Signs erected at strategic points inviting public to see eradication work.

Lectures and demonstrations presented to school and college classes.

Diamond-shaped posters placed on protected areas in Wisconsin.

1936

Wisconsin Department of Agriculture released two blister rust control reels, one showing ribes eradication and one mapping.

Madison Indians supplied one white pine log - 20 feet long, 4 feet 3 inches in diameter, for permanent exhibit at Wisconsin State Fair grounds, Milwaukee.

1937

Federal WPA Art Project, Milwaukee made 6 paintings each 2 feet by 2 1/2 feet to illustrate ribes eradication, mapping and blister rust damage.

Question and answer bulletin prepared by Chambers and Koubes, Wisconsin.

1939

Wisconsin Department of Agriculture published Bulletin 204, "White Pine Blister Rust in Wisconsin." (194)

Circular "Keys to the Species of Ribes Occurring in the Great Lakes Region" issued. (195)

Movable exhibits and panels prepared in Minnesota.

1940

Kodachrome motion picture completed in Wisconsin.

1941

Manual for Blister Rust Control in Ohio (Dowd) issued by Ohio Agricultural Experiment Station.

1947

Regional White pine Blister Rust Control field manual issued.

1948

New Motion Picture film (color and sound) released; titled "Paul Bunyan Had a Son"; scenario by Newton and Kroeber.

1949

Copies of the two films distributed to states, libraries.  
Nearly 300 showings made to over 50,000 persons.

1950

Nearly 500 showings of the two blister rust films.

NORTHWESTERN REGION

1923

Educational program for removal of cultivated black currants carried on in public schools.

1924

Educational program expanded in all states.

1926

Western news letter started as a means of educating blister rust workers on current developments. Colored slides used in educational work.

1928

First annual blister rust exhibit at the Spokane Sportsmen's Fair. Exhibits presented in later years at various county fairs in Northwest.

1933

Large-scale training program developed to train overhead for CCC camps.

1934

Training programs increased to train overhead and workers for CCC and NIRA camps.

Educational program developed for CCC camps.

1936

Started educational trips into BRC operations for civic organizations and cooperators.

1937

"Ribes Eradication Manual for use in the Inland Empire" issued.

1938

First western blister rust film produced entitled "The Story of White Pine Blister Rust"; scenario by E. L. Joy.

1941

Intensive safety and accident prevention programs started.

1944

First training manuals issued, and systematized training programs for laborers initiated.

1947

First power-spraying school held.



1947 Cont'd

Comprehensive training charts and manuals developed for the region.

1948

New motion picture film (color and sound) released; titled "A Destructive Invader"; scenario by Newton.

1949

The Forest Service and the Bureau cooperated to present a blister rust exhibit at the Sportsmen's Fair in Spokane, an event which was again resumed after a lapse of several years.

1933

Graduation Manual of Instructions adapted to West Coast field conditions published for operational use.

First checking manual issued.

1934

"Blister Rust Checking Manual" revised and enlarged.

1935

"Crewleaders Handbook" published for use in training field men.

"A Training Course for Blister Rust Control Workers" published as training aid for Civilian Conservation Corps workers.

1936

Preparation of Scouting Manual for Sugar Pine Region.

1937

Manual for "First Aid Instructions for Blister Rust Control Camps" published for field use.

1939

"Camp Sanitation and Safety Manual for Blister Rust Camps in California and Oregon" published.

1940

Motion picture in color for informational and training purposes prepared locally by project personnel.

1941

A portable, permanent diorama blister rust exhibit prepared by the U.S.D.A. Office of Exhibits was shown at 11 county fairs.

1943

Job Instruction Training (J.I.T.) courses given to permanent staff during winter season.

1946

Disease Survey Manual completed for California and Oregon.

1948

Blister rust motion picture film (color and sound) released; titled "King of the Softwoods" especially prepared for the Pacific Coast sugar pine area.

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1951

Publication of brochure "Blister Rust - Scourge of Sugar Pines" for general distribution.

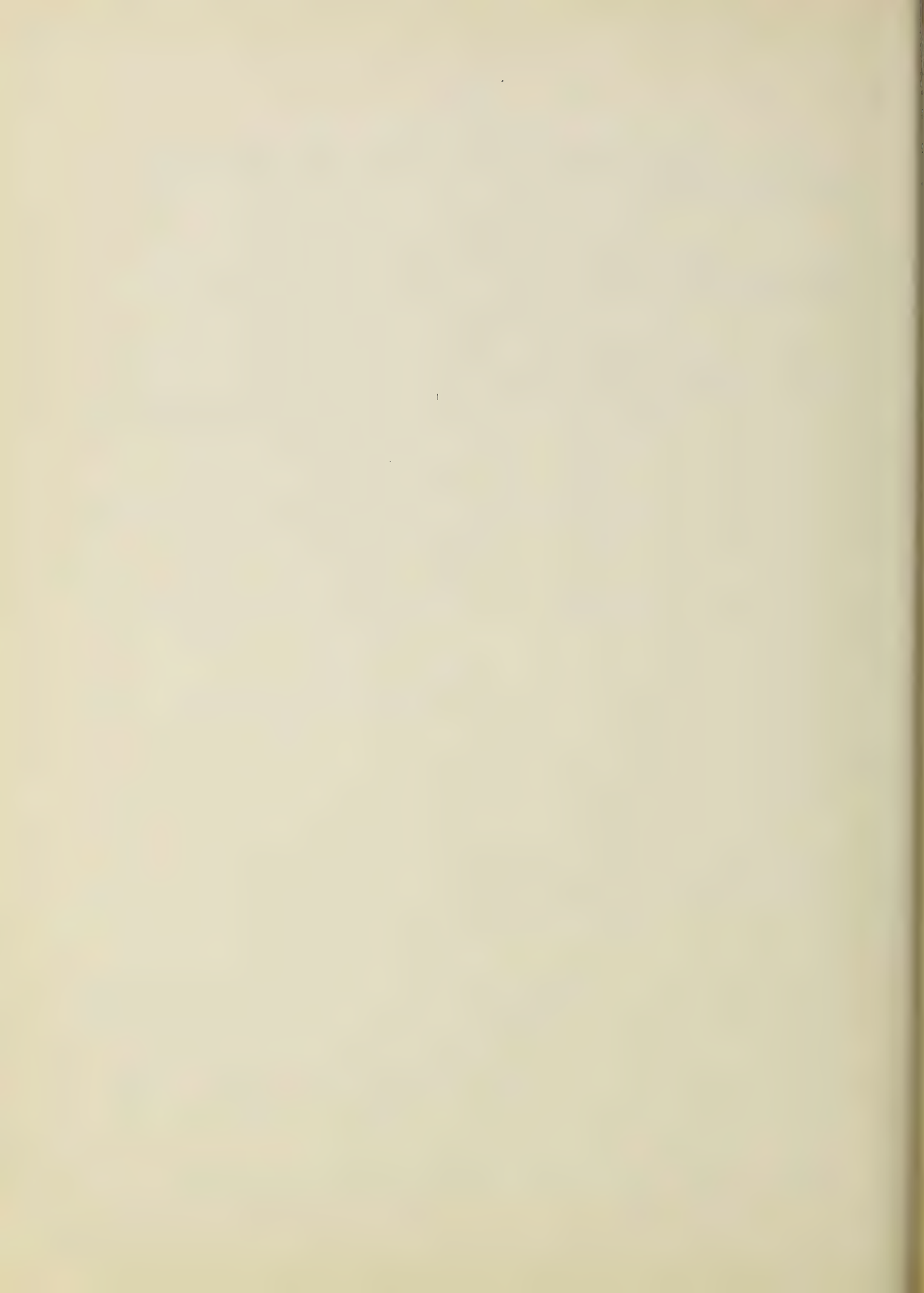
1952

Permanent display panels prepared for five national parks in California and Oregon.

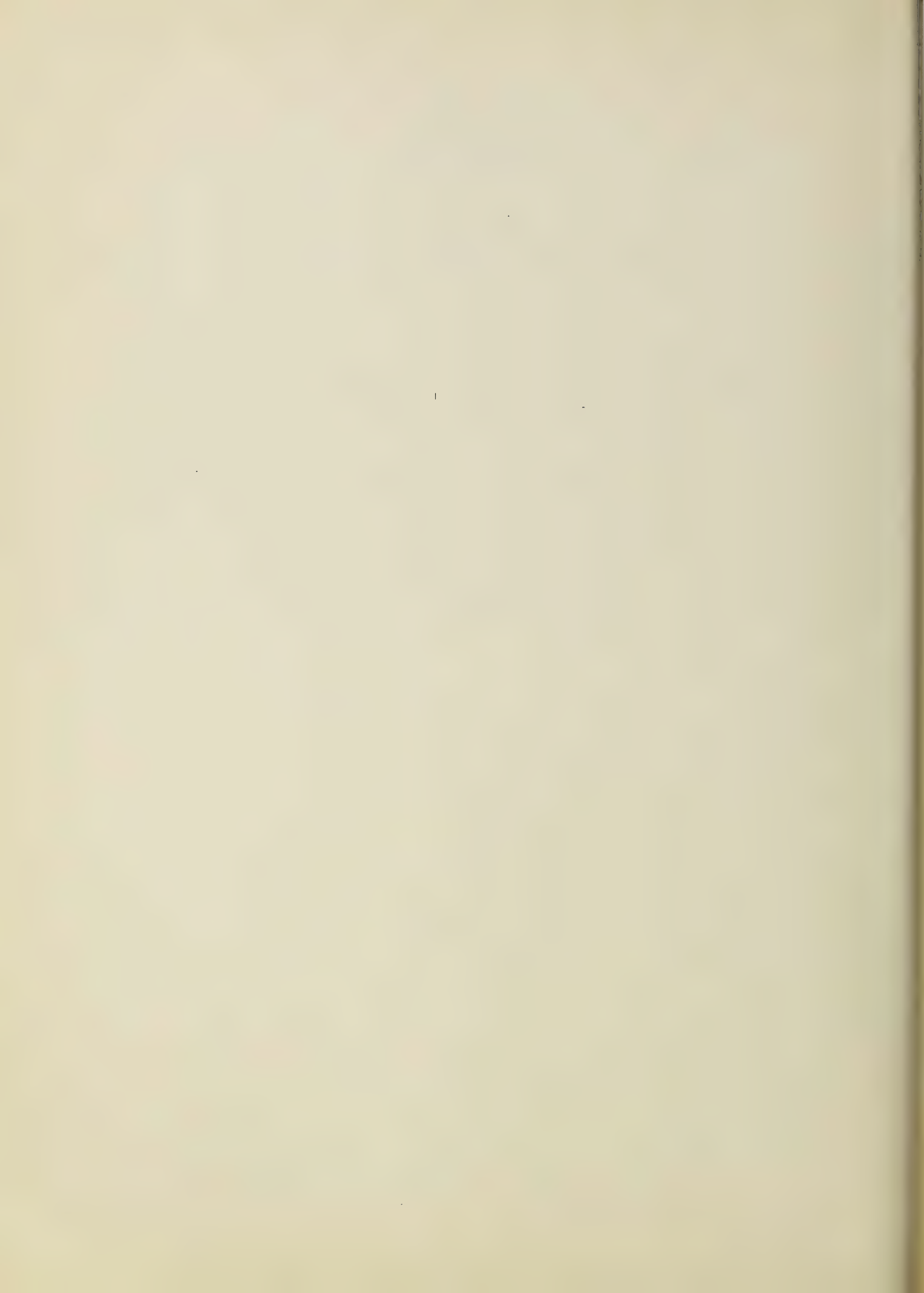
1953

Permanent display in portable cabinet form prepared.





FIELD METHODS





FIELD METHODS  
NORTHEASTERN REGION

1917

Demonstration control areas established in the New England States and New York, to develop crew procedures. In New York alone, 130,352 acres were cleared of ribes.

1918

Advance scouting eradication method initiated in New Hampshire.

Various ribes uprooting tools devised and tested, including pronged pick and hooks.

Methods to mark crew strip boundaries developed. These included bark blazes, broken twigs, old magazine paper, red cloth, red tin tags, and the first use of "dropped paper".

Field study (Filler) made of control procedures as basis for issuance of field manual.

Improved field procedures demonstrated in New Hampshire.

1919

Protection zone widths reduced from 1500 ft. to 900 ft.

Federal checking crew organized.

1920

Efficiency of ribes eradication demonstrated by numerous checks by crews and federal inspectors.

1923

Systematic checking of control work by crews and trained state and federal inspectors developed.

1925

Crew methods and effectiveness of control studied in Connecticut.

1927

Protection zone width around nurseries increased to 1500 ft. with the removal of European black currants for one mile.

1928

Use of sodium chlorate tested on Ribes glandulosum in Massachusetts.

1934

First use (in New York) of borax as a ribicide - 30 percent kill obtained on several hundred bushes treated. Required only  $\frac{1}{2}$  as much time as hand pulling.

1937

First use of autogiro for mapping pine in Pennsylvania and Maryland; 761,000 acres examined.

1938

Autogiro used in mapping hurricane blow-downs in New Hampshire.

Standard of 35 feet of live stem per acre adopted as requisite for approval of ribes eradication work.

1939

New Permanent Map and Record System (CO-105) devised.

1940

Pine Protection Standards adopted.

1941

First use of Maintenance classification to designate areas where control has been established.

1942

Revised General Checking procedure adopted. Eradication standard of "not more than 20 feet of live-stem per acre" adopted.

1943

First use of salt and borax to kill decapitated large-sized ribes or those growing in locations where manual removal is costly and ineffective.

1944

Initial tests in the use of aerial photographs for control area mapping.

1946

Increased use of smaller ribes eradication crews, 4-3- and 2-man "crews" replacing 5-man units.

Mapping procedures revised and standardized to provide for mapping directly on 4" - to - the - mile scale aerial photograph enlargements.

1947

Initial tests in the use of 2,4-D and 2,4,5-T on decapitated sprouts proved effective on most species of ribes.

1948

Greater use of scouts and small crews and improved procedures resulted in a 33 percent increased output per man day.

Tests of several one-man "crew" methods shows that this size unit has advantages where ribes population is light to medium.

1949

Extensive tests of "drag-line" method gives good results in areas where ribes are abundant and generally distributed.

Tests with the use of 2,4-D and 2,4,5-T on Ribes americanum and R. glandulosum showed good results.

Standards established for use in determining when areas are ready for the maintenance classification. Qualifying standard: an average ribes population of less than four per acre as revealed by current working.

1950

Special test of the use of a helicopter for mapping indicated possibilities for speeding up mapping and reducing costs.

New type of drag-line developed involving 18 gauge, 16 strand, copper wire covered with orange colored plastic cord, substituted for Venetian window cord.

1952

Application of an aqueous solution of 2,4,5-T to ribes in full leaf, adopted as standard practice for the eradication of large concentrations of skunk currants and American black currants.

Airplane used in New York for control area examination specifically for determining the location and extent of scattered pine areas.

Experiments conducted to develop methods of sampling (checking 5 percent - 10 percent of an area) to determine need for ribes eradication in maintenance areas.



SOUTHERN APPALACHIAN REGION

1936

Grid system type of survey started.

1937

Mapping pins from an autogiro tried experimentally in Maryland.

1939

Systematic strip checking inaugurated.

1941

Salt and borax issued for use in ribes eradication.

1944

Extensive use made of aerial survey maps on survey in Virginia and North Carolina.

1945

Field forms revised.

1946

Began using aluminum location markers to designate grid lines and corners. Revised field forms placed in use.

Crew size reduced, three-man crew made standard.

1947

Started use of small aluminum tags to mark strip lines on road traverse survey in West Virginia.

1948

The one-man crew system (drag-line) tried out on 500 acres. Not too effective because of heavy brush and rock outcrops, but under certain conditions the system may be used to advantage.

1949

Further tests of use of one-man crew system for eradication of ribes indicated practically no advantage over other methods in this region, therefore its use abandoned.

NORTH CENTRAL REGION

1933

Minimum size and stocking standards established for protecting pine. Full 900 foot protection zones used.

1934

Value of screening recognized and protection zone widths in dense swamps reduced.

1938

Control zone widths further modified to take advantage of screening by dense growth.

1943

Survey work facilitated by increased use of aerial photographs.

Salt-borax used for the first time to kill ribes lodged in rocky situations.

1945

2,4-D tried in chemical eradication experiments.

1946

Experiments with 2,4-D continued; chemical kills Ribes americanum but results on other ribes not too promising.

1947

Improvements made in survey techniques using improved aerial photographs.

Chemical eradication used to supplement hand-pulling ribes on areas supporting Ribes americanum. 2,4-D also used to treat decapitated bushes, in place of salt-borax.

1948

Results of 1947 treatments with 2,4-D effectively demonstrated that such treatment on Ribes americanum was more effective than hand-pulling.

Large scale experiments with the use of 2,4,5-T were undertaken to test effectiveness especially on species of ribes other than black currants. Initial results were promising.

Increasing use of smaller crew units (3 or 4 men) proved to be more effective and efficient.

One-man drag line system was tried out for the first time. Conclusion was that

1948 Cont'd

the system works well where ribes are of medium size on upland types where brush is not too dense. The most effective line was found to be 8-ply braided cord used in making Seine nets.

1949

New scout method tried in situations where ribes are normally scarce or not generally distributed. The scout looks for new cankers and when found, he works the surroundings to locate the causal ribes.

Experimental work showed that both Ribes americanum and R. hudsonianum can be readily killed with a comparatively weak aqueous solution of 2,4-D, but it is not an effective chemical against other species of ribes. Tests with 2,4,5-T in kerosene or fuel oil proved effective as a basal spray for several species of gooseberries, Ribes americanum and R. lacustre.

1951

Plans for the chemical eradication of ribes included the extension of the eradication season through basal spraying of ribes in the dormant season with 2,4,5-T in oil.

1952

Emphasis given to chemical eradication of ribes especially in the dormant season on upright ribes growing on upland areas. Findings indicate that such ribes can be effectively and economically killed by basal treatment with 2,4,5-T in fuel oil.

Contract ribes eradication started.

Blocked quadrat survey method replaced white pine count.



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NORTHWESTERN REGION

1922

Experimental manual ribes eradication started on private land near Elk River, Idaho.

1923

Experimental ribes eradication started with five-man crew on the Priest River Experimental Forest.

1925

Sodium chlorate showed promise as a ribicide.

First organized checking of ribes eradication work.

1926

Scouting method of ribes eradication developed as a forerunner of checker-flanker method.

Eradication of Ribes petiolare with sodium chlorate proved highly practical.

String used experimentally to mark crew lanes.

Strip method of checking adopted.

1927

String replaced paper as marker for crew lanes, and trench picks became standard equipment.

Power spraying stream type found to be practical.

1928

Re-eradication work started experimentally.

Methods improvements: (A) 3-man crew, (B) uphill and downhill work, (C) one man to each lane shown to have merit. One-man method of mop-up work developed.

1929

Chemical ribes eradication methods project conducted at Morrow Bay, California.

Knapsack spraying unit devised. Power spraying method improved and employed on the Clearwater National Forest.

1930

Chalk, burn, and plant to poison developed as a method of ribes eradication in the Clearwater National Forest.

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1931

First use for the first time as a method of brush clearing and ribes eradication in stream bottoms.

1932

Bulldozer method improved by the invention of the tooth blade.

Oblique aerial photographs introduced as aid to pre-eradication surveys.

New spraying methods, including ground boom, employed in stream areas.

1933

Present-day checking methods and procedures for recording and mapping done.

First modern "Ribes Eradication" and "Checking" manuals prepared.

Large areas of brushy stream bottom slashed, burned, and converted into hay meadows on St. Joe area.

1934

Ribes decapitation methods developed.

1935

Bulldozer areas converted into excellent hay meadows on the Kazikou area.

1936

The "claw mattock" ribes tool invented by a WPA worker, selected as standard ribes removal tool.

New silver zones established on spruce and burn white pine sites.

1937

Control burning undertaken as an integrated silvicultural and blister rust control measure for growing white pine.

1938

Ammonium sulfamate used as a ribicide.

1939

Annate replaced Atlacide in stream type spraying.

2,4-D replaced Annate in treatment of Ribes petiolare.

-101-

1947

Hi-Fog gun proved practical with hormone sprays.

Power spraying started in upland areas.

First contracts awarded for ribes eradication.

1948

2,4,5-T employed on expanded scale in upland spraying with Hi-Fog guns and power units and replaced 2,4-D in other chemical work.

One-man ribes eradication method using dragline adopted universally in the region.

1950

Power spraying methods on cutover lands prove highly effective.

1951

Basal stem treatment determined to be effective at any time during the field season.

1952

The development of light portable power spray units expanded the possibilities of power spraying into remote areas.

A critical analysis of all phases of field activities led to an increase in production and better efficiency, by placing proper emphasis applicable to methods and procedures.



PACIFIC COAST REGION

1933

Change from experimental to practical control of blister rust in California.

1944

Reproduction of checking maps simplified by use of overlays combined with the Directo process of printing.

1945

Promising results of 2,4-D as a ribicide opened up the field for use of power-spraying equipment.

1946

Classification adopted for sugar pine lands according to expected yield by means of method based on site, quality and stocking.

1947

Use of chemicals in ribes eradication adopted as standard field method on areas of heavy bush concentrations.

1948

One-man crew system of ribes eradication adopted as standard practice.

1949

Results of disease surveys indicated that the width of protective strips could be decreased. This eliminated the necessity for control work on large acreages non-productive of sugar pine, and made practical the protection of small pine stands heretofore excluded.

Control standards for ribes eradication redefined in terms of three degrees of rust hazard.

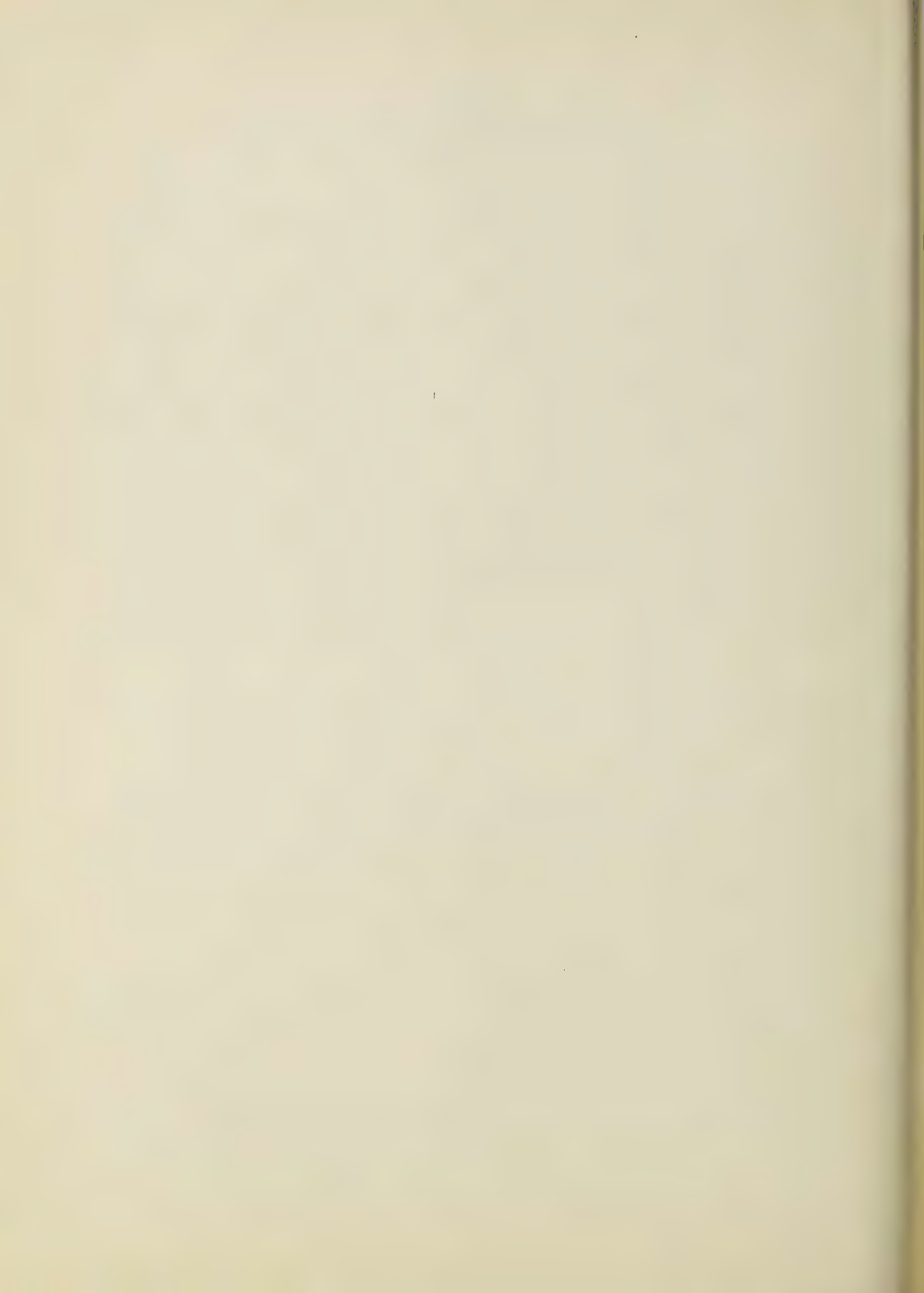
1950

Successful application of decapitation and basal stem methods of ribes eradication on an operational basis.

1952

The Mt. Whitney Camp, at an elevation of 10,500 feet above sea level, on the Sequoia-Kings Canyon National Park area was moved in by airplane. Personnel were flown in over the Divide and equipment and supplies were successfully dropped by parachute.

ACCOMPLISHMENTS IN RIBES ERADICATION





ACCOMPLISHMENTS IN REGULAR RIBES ERADICATION

NORTHEASTERN REGION

1918-1952

<u>Calendar Year</u>	<u>Acres</u>	<u>Ribes</u>	<u>Man Days</u>
1918	137,458	2,438,037	31,207
1919	252,043	4,577,825	43,595
1920	270,318	4,327,876	29,271
1921	320,361	3,752,865	29,027
Period Total:	<u>980,180</u>	<u>15,094,603</u>	<u>133,100</u>
1922	399,892	4,865,873	30,257
1923	758,275	8,024,991	50,277
1924	853,174	9,601,645	53,102
1925	725,978	7,405,747	43,376
1926	694,055	8,909,542	46,417
Period Total:	<u>3,431,374</u>	<u>38,807,798</u>	<u>223,429</u>
1927	796,025	8,096,571	48,631
1928	803,297	6,740,562	50,421
1929	839,139	7,743,340	55,951
1930	633,850	8,217,067	49,895
1931	578,291	7,196,089	49,950
Period Total:	<u>3,650,602</u>	<u>37,993,639</u>	<u>254,848</u>
1932	544,620	4,811,417	39,057
1933	552,855	12,763,539	152,726
1934	813,073	23,157,628	219,413
1935	1,125,289	28,884,421	355,687
1936	1,784,378	55,742,674	527,312
Period Total:	<u>4,820,215</u>	<u>125,359,679</u>	<u>1,294,195</u>
1937	717,522	17,439,376	212,862
1938	744,792	13,876,310	205,045
1939	701,141	13,556,085	160,390
1940	701,838	10,983,619	139,239
1941	575,572	5,732,116	78,609
Period Total:	<u>3,440,865</u>	<u>61,589,506</u>	<u>796,145</u>
1942	488,614	3,169,027	32,551
1943	388,354	2,574,503	27,418
1944	414,100	2,491,161	29,423
1945	497,247	2,147,268	31,607
1946	862,483	4,989,209	64,922
Period Total:	<u>2,630,798</u>	<u>15,371,168</u>	<u>185,921</u>

<u>Calendar Year</u>	<u>Acres</u>	<u>Ribes</u>	<u>Man Days</u>
1947	968,351	4,057,595	55,778
1948	968,163	3,562,122	41,861
1949	1,010,688	3,918,825	34,831
1950	955,309	4,004,864	32,265
1951*	<u>991,285</u>	<u>3,131,253</u>	<u>33,706</u>
Period Total:	<u>4,893,796</u>	<u>18,674,659</u>	<u>198,441</u>
1952*	1,007,286	3,348,185	34,623

\* Includes former Southern Appalachian Region

SOUTHERN APPALACHIAN REGION

1928-1950

<u>Calendar Year and Period</u>	<u>Acres Worked</u>	<u>Number of Ribes</u>	<u>Number Man Days</u>
1922-1926	None performed		
1928-1931 ) No individual ) yearly figures ) available here. ) 1932-1936 )	2,864,913	10,279,651	82,326
1937	1,248,773	5,216,119	48,812
1938	735,008	4,750,971	40,828
1939	491,106	3,230,851	34,218
1940	655,821	3,106,985	28,663
1941	615,872	2,090,146	24,923
Period Total:	3,746,580	18,395,072	177,444
1942	197,541	906,407	9,238
1943	562,627	817,615	10,191
1944	43,531	912,662	11,595
1945	41,528	1,389,317	12,467
1946	35,182	1,196,492	12,108
Period Total:	880,409	5,222,493	55,599
1947	31,936	578,106	13,067
1948	45,415	567,336	8,291
1949	128,582	562,226	9,813
1950	119,520	492,532	8,384
Period Total:	325,453	2,200,200	39,555



## NORTH CENTRAL REGION

1917-1952

Calendar Year	Acres Worked	Ribes Bushes Destroyed	8-Hour Man Days Used
1918	1,200	90,000	700
1919	2,440	156,304	930
1920	11,739	900,335	3,514
1921	<u>9,476</u>	<u>496,866</u>	<u>2,805</u>
Period Total:	<u>24,855</u>	<u>1,643,505</u>	<u>7,949</u>
1922	4,845	531,862	718
1923	3,347	204,043	1,022
1924	-	-	-
1925	-	-	-
1926	<u>208</u>	<u>5,240</u>	<u>63</u>
Period Total:	<u>8,400</u>	<u>741,145</u>	<u>1,803</u>
1927	250	42,226	76
1928	1,835	160,536	370
1929	2,750	190,117	1,114
1930	8,957	577,593	3,073
1931	<u>15,581</u>	<u>838,647</u>	<u>3,295</u>
Period Total:	<u>29,373</u>	<u>1,809,119</u>	<u>7,928</u>
1932	39,058	2,829,609	6,824
1933	133,275	9,228,876	36,386
1934	394,583	40,074,440	144,831
1935	481,695	39,224,673	181,382
1936	<u>584,994</u>	<u>56,746,738</u>	<u>186,831</u>
Period Total:	<u>1,633,605</u>	<u>148,104,336</u>	<u>556,254</u>
1937	311,922	15,808,034	75,947
1938	354,988	18,700,421	84,555
1939	366,019	17,823,664	83,292
1940	339,509	16,592,751	68,888
1941	<u>289,756</u>	<u>10,899,469</u>	<u>54,666</u>
Period Total:	<u>1,662,194</u>	<u>79,824,339</u>	<u>367,368</u>
1942	234,881	3,858,141	25,693
1943	109,219	2,061,192	15,490
1944	122,014	2,737,714	19,441
1945	153,160	3,043,605	23,299
1946	<u>299,856</u>	<u>4,890,501</u>	<u>39,989</u>
Period Total:	<u>919,130</u>	<u>16,591,153</u>	<u>123,912</u>

Calendar Year	Acres Worked	Ribes Bushes Destroyed	8-Hour Man Days Used
1947	179,201	3,748,277	27,767
1948	125,304	1,937,763	18,929
1949	137,634	2,849,940	21,602
1950	131,925	1,496,466	16,646
1951	<u>128,486</u>	<u>1,362,616</u>	<u>16,341</u>
Period Total:	<u>702,550</u>	<u>11,394,961</u>	<u>101,285</u>
1952	130,177	1,352,914	14,805

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NORTHWESTERN REGION

1923-1952

<u>Calendar Year</u>	<u>Acres</u>	<u>Ribes</u>	<u>Man-Days</u>
1923-1931	109,190	23,769,000	76,600
1932	115,550	15,322,000	51,000
1933	223,960	40,167,000	195,500
1934	671,400	113,913,000	475,500
1935	280,100	53,748,000	239,060
1936	331,470	56,253,000	221,700
1932-1936	1,622,480	279,403,000	1,182,760
1937	131,450	27,087,000	120,900
1938	172,910	38,374,000	196,500
1939	104,870	28,377,000	158,300
1940	117,600	19,834,000	144,150
1941	71,220	8,770,000	78,260
1937-1941	598,050	122,442,000	698,110
1942	49,910	5,656,000	53,990
1943	36,750	3,791,000	47,100
1944	37,470	2,647,000	49,530
1945	51,280	6,403,000	65,920
1946	56,370	4,609,000	64,490
1942-1946	231,780	23,106,000	281,030
1947	81,240	3,485,000	58,710
1948	52,600	3,494,000	47,260
1949	52,950	2,646,000	45,820
1950	61,910	3,378,000	46,970
1951	46,330	2,440,000	46,770
1947-1951	295,030	15,443,000	245,530
1952	54,400	3,418,000	55,230



PACIFIC COAST REGION

1925-1952

<u>Calendar Year</u>	<u>Gross Acres</u>	<u>Ribes</u>	<u>Man Days</u>
1925	1,874	70,346	889
1926	3,134	183,296	1,218
Total:	5,008	253,642	2,107
1927	4,102	235,543	1,173
1928	8,550	268,202	1,197
1929	3,594	463,784	1,863
1930	5,502	194,902	598
1931	17,340	340,005	1,694
Total:	39,086	1,502,436	6,525
1932	9,350	116,132	646
1933	44,923	5,946,468	30,077
1934	213,463	20,383,707	67,285
1935	92,937	15,013,181	43,431
1936	190,322	27,675,865	90,690
Total:	550,995	69,135,353	232,129
1937	61,890	9,526,570	52,670
1938	109,553	23,093,653	119,258
1939	201,071	19,339,389	135,119
1940	156,728	18,702,711	142,279
1941	63,976	7,058,076	39,604
Total:	593,218	77,720,399	488,930
1942	67,369	6,706,707	40,452
1943	64,594	6,873,048	50,115
1944	53,788	7,397,032	53,156
1945	62,546	5,955,519	51,624
1946	89,300	9,465,528	75,571
Total:	337,597	36,397,834	270,918
1947	116,242	10,326,675	78,816
1948	111,186	10,118,412	67,114
1949	125,494	8,969,132	54,712
1950	121,203	9,076,239	48,114
1951	86,370	7,686,000	35,292
Total:	560,495	46,176,458	284,048
1952	114,486	5,554,000	32,891

UNITED STATES

1918 - 1952

<u>Period</u>	<u>Gross Acres Worked</u>	<u>No. Ribes Destroyed</u>	<u>Man Days Used</u>
1918 - 1921	1,005,035	16,738,108	141,049
1922 - 1926	3,444,782	39,802,585	227,339
1927 - 1931	3,828,253	60,074,194	345,901
1932 - 1936	11,492,208	632,282,019	3,347,664
1937 - 1941	10,040,907	359,971,316	2,527,997
1942 - 1946	4,999,714	96,688,648	917,380
1947 - 1951	6,777,324	93,889,278	868,859
1952	1,306,349	13,673,099	137,549
Total			
1918 - 1952	42,894,572	1,313,119,247	8,513,738

ACCOMPLISHMENTS IN THE ERADICATION OF RIBES NIGRUM

1912 - 1912

<u>Region</u>	<u>Number Properties Inspected</u>	<u>Number Plantings Found</u>	<u>Number Ribes nigrum plants Destroyed</u>	<u>Total Man Days Used</u>
Northeastern	1,705,433	46,397	108,376	99,136
So. Appalachian	71	17	3,352	21
North Central	4,393,163	35,996	292,451	116,750
Midwestern	56,594	8,647	99,900	7,000
Pacific Coast	*	*	60,323	2,151
United States	6,155,261	90,946	559,902	185,089

\* No record kept.



ACCOMPLISHMENTS IN NURSERY SANITATION

1922 - 1952

<u>Region</u>	<u>Number Nurseries Initially Protected</u>	<u>Number Protected Nurseries Still Active</u>	<u>Number Acres Worked</u>	<u>Number Ribes Destroyed</u>	<u>Total Man Days Used</u>
Northeastern	138	34	299,321	532,975	18,794
So. Appalachian	45	6	95,716	49,060	1,689
North Central	90	43	35,597	3,575,567	33,582
Northwestern	3	1	13,100	1,674,000	10,400
Pacific Coast	5	2	2,437	30,719	1,080
United States	281	86	446,171	5,862,321	65,545

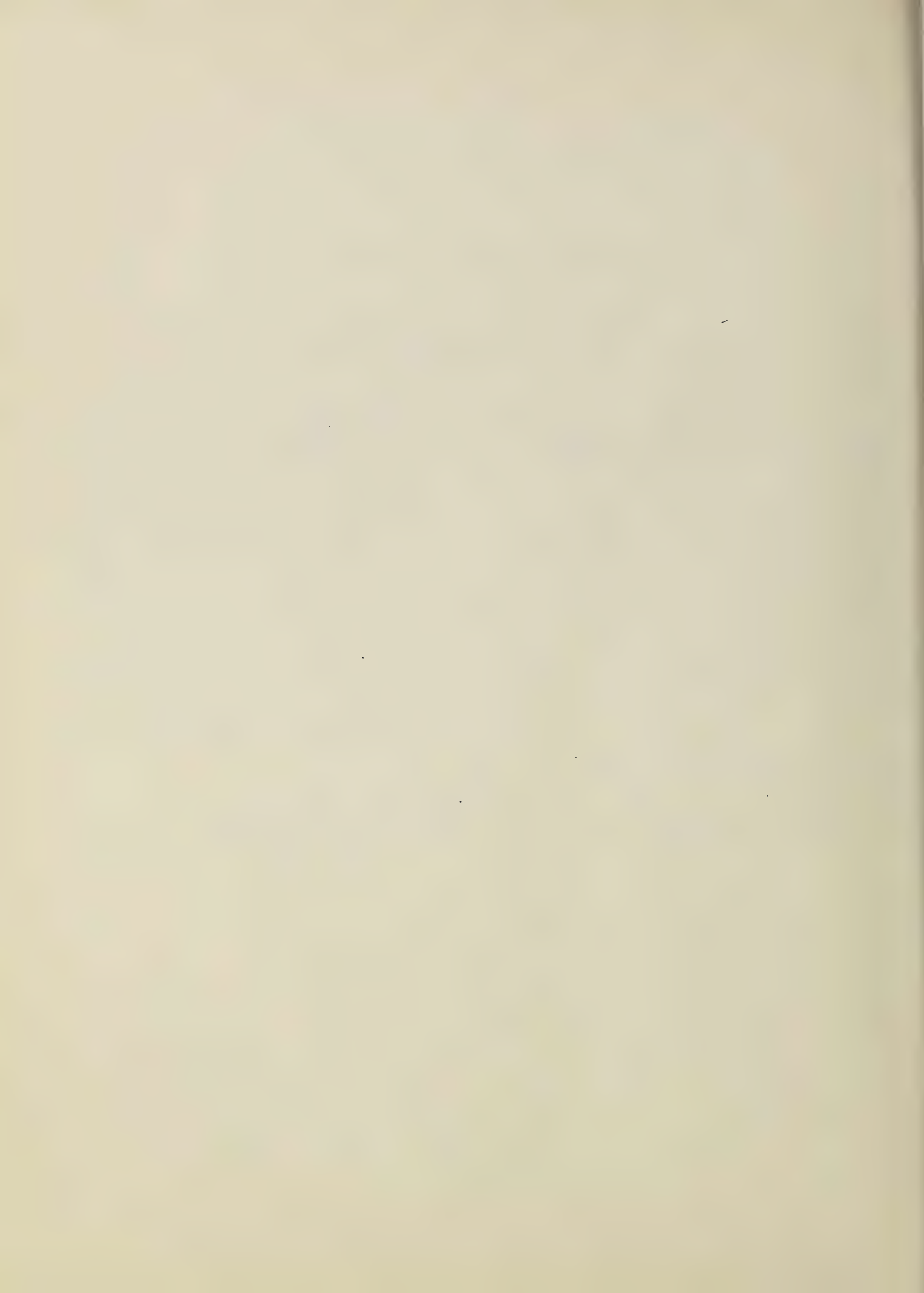
ACCOMPLISHMENTS IN CANKER REMOVAL

1916 - 1952

<u>Region</u>	<u>Number Pines Remained</u>	<u>Number Fatally-Infected Pines Too Low</u>	<u>Number Pines From Which Cankers Removed</u>	<u>Number Cankers Removed</u>	<u>Total Man Days Used</u>
Western	8,175,360	287,442	395,926	947,387	37,487
Central	825,122	11,038	34,597	197,831	4,214
North Central	1,663,529	12,149	146,052*	222,738	3,155
Southwestern	**	**	**	**	**
Florida, West	408,404	17,468	32,845	461,812	3,183
Grand Totals	11,132,415	328,107	609,420	1,809,826	51,044

\* Includes pine plantations, mostly in California.

\*\* Detailed records not available; all pine were treated by aerial application of chemicals.









# STATUS OF CONTROL WORK IN NET CONTROL AREA

1952\*\*

Ownership	Region	Control Area		Acreage		Acreage		Acreage On		Percentage	Pre-Maintenance	
		Acreage	White Pine	Detail Mapped	Acreage	Maintenance	Maintenance	First Year	Mark			
State and Private	Northeastern*	16,063,951	6,164,828	14,257,595	11,801,182	73.5	391,833	2,273,000				
	North Central	3,180,841	928,367	3,180,841	1,229,355	38.6	510,799	1,440,000				
	Northwestern	1,111,730	991,730	1,111,730	230,490	20.7	516,000	1,000,000				
	Pacific Coast	617,532	617,532	390,742	55,336	9.0	226,790	1,000,000				
United States		20,974,054	8,702,447	18,940,908	13,316,363	63.5	1,645,534	5,013,000				
National Forests	Northeastern*	1,775,514	1,013,592	1,775,454	1,700,287	95.8	459	71,000				
	North Central	308,297	144,766	308,297	204,034	66.2	24,812	79,000				
	Northwestern	1,387,000	1,183,000	1,387,000	389,000	28.0	316,000	800,000				
	Pacific Coast	668,332	668,332	457,315	80,482	12.0	211,017	300,000				
United States		4,139,143	3,009,690	3,928,066	2,373,803	57.4	552,268	1,813,000				
National Parks	Northeastern*	155,936	79,958	139,064	147,154	94.4	0	0				
	North Central	120	15	120	0	0.0	0	0				
	Northwestern	28,110	28,110	28,110	17,200	61.2	3,110	7,000				
	Pacific Coast	169,508	169,508	134,425	94,927	56.0	35,053	50,000				
United States		353,574	277,591	301,719	259,281	73.3	38,193	57,000				
Indian Service	Northeastern*	445	22	445	445	100.0	0	0				
	North Central	139,297	82,917	139,297	99,943	71.7	4,033	86,000				
	United States	139,742	82,939	139,742	100,388	71.8	4,033	86,000				
Other	Northwestern	29,000	21,000	29,000	7,000	24.1	14,000	8,000				
	Pacific Coast	52,950	52,950	47,282	18,848	35.6	5,668	28,000				
	United States	81,950	73,950	76,282	25,848	31.5	19,668	36,000				
All ownerships	Northeastern*	17,995,846	7,258,390	16,172,558	13,649,068	73.8	392,438	5,134,000				
	North Central	3,628,555	1,156,065	3,628,555	1,533,332	42.3	539,810	1,533,000				
	Northwestern	2,555,840	2,223,840	2,555,840	643,690	25.2	849,110	1,643,000				
	Pacific Coast	1,508,322	1,508,322	1,029,764	249,593	16.5	478,528	750,000				
United States		25,688,563	12,146,617	23,386,717	16,075,683	62.6	2,259,745	7,056,000				

\* Includes former Southern Appalachian Region

\*\* Reporting date varies in the several regions from October through December 1952



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- \_\_\_\_\_    Insure your white pine.  
Colored card - Mass. Dept. Agr.
- McIntyre, H. L.    Lesson in white pine blister rust control.  
Bul. 17 N. Y. State Con. Dept.
- Nelson, DeWitt    Blister<sup>Rust</sup> Scourge of sugar pines.  
Cal. Dept. of Natural Resources
- Raber, Oran    Winter key to cultivated currants and gooseberries, etc.

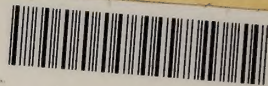






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